SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[*The* MINING JOURNAL *is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.*]

No. 2083.—VOL. XLV. LONDON, SATURDAY, JULY 24, 1875. PRICE (WITH THE JOURNAL) SIXPENCE. PER ANNUM, BY POST, £1 4s.

Original Correspondence.

THE IRON INDUSTRIES OF SOUTH STAFFORDSHIRE AND WORCESTERSHIRE.

By RICHARD MEADE, Assistant Keeper of Mining Records,
Museum of Practical Geology.

[*Continued from last week's Journal.*]

In a previous notice we considered the area in this coal field, in which the iron industries are located, in relation to the production of its seams of coal and measures of ironstone. The flooded condition of the mines in this district renders the enormous quantity of 150,000,000 tons of coal unworkable. To provide a remedy, and make this great mass of coal, and the ironstone measures associated with it, more easily available, "The South Staffordshire Mines Drainage Act, 1873," was passed, the works of which are already being pushed forward vigorously. This flooding or ponding up of water in the mines has been occasioned by the subsidence of the surface, thereby diverting the natural channels and streams, causing hollows and fissures through which the water finds its way into the mines below, thus becoming a fruitful source of danger to life and property. By the Act above referred to an efficient system of drainage will be secured to the district, both above and below ground, funds for carrying out the necessary works being provided by two distinct rates—the one called a "General Drainage Rate," applicable to surface drainage; the other the "Mines Drainage Rate," applicable to the purposes of underground drainage. The works under the Act are being carried out under the able management of Mr. E. B. Marten, C.E., of Stourbridge, and a comprehensive and instructive model on a large scale of the area of the country included in the Act, is in course of construction by Mr. James B. Jordan, under Mr. Marten's superintendence.

We shall now proceed to consider the early history, progress, and development of the important metallurgical industries of the district.

PIG-IRON MANUFACTURE.—The history of the manufacture of iron may be regarded as of two distinct periods—the one extending from the earliest times when charcoal was alone employed; the other commencing with the successful application of coal previously coked, and dating about the year 1735. In the early part of the 17th century the rapid devastation of our forests occasioned great scarcity in the supply of charcoal to our furnaces, so much so, that three-fourths of the blast-furnaces in the kingdom came to a standstill; it was at this period that attention was directed to the use of coal previously coked. In 1612 we find Simon Sturtevant, and again in 1613 Ravenson working towards this end; they were unsuccessful; in 1620, however, the use of mineral fuel was proved practicable in the reduction of the ores of iron, and we find Dud Dudley, the founder of the noble house of Dudley, to whom a patent was granted in the same year for smelting iron ore with pit or sea coal, to have so far succeeded as to have made 3 tons of pig-iron from a furnace in a week with coke. Dud Dudley, in his book "Metallum Martis," published in 1665, gives an interesting account of his labours and the difficulties encountered by him. His works were swept away by a great flood; he further tells us that they were repaired, and at a subsequent period riotously destroyed, and he himself utterly ruined by adhering to the royal cause which disturbed society in those days. With this historical reference we advance to the year 1735, when the successful application was carried out by Mr. Abraham Darby, of Shropshire, at the Coalbrookdale Works, and from this period may be dated the first great improvement in the manufacture of pig-iron. A few years later, in 1740, we find the production of Great Britain recorded as follows:—

District	Furnaces.	Pig-iron.
Brecon	2 ..... Tons	600
Carmarthenshire	1	100
Cheshire	3	1,700
Derbyshire	2	550
Glamorganshire	2	400
Gloucestershire	4	800
Hampshire	3	1,350
Herefordshire	6	2,850
Kent	1	200
Monmouthshire	2	900
Montgomeryshire	4	400
Nottinghamshire	1	200
Shropshire	6	2,100
Staffordshire	2	1,000
Sussex	10	1,400
Worcestershire	2	700
Warwickshire	2	700
Yorkshire	6	1,400
Total	59	17,350

The make of pig-iron in this district in the year 1740, as shown in the above return, amounted to 1700 tons, the yield of four furnaces. The next account we have is for the year 1788, when three furnaces in which coke was employed produced 2400 tons; in the same year the quantity of pig-iron made in England and Wales is recorded as follows:—

	No. of furnaces.	
Charcoal iron	24 ..... Tons	13,100
Coke iron	53	48,200
Total	77	61,300

Some 20 years after the successful application of coal in the manufacture of iron by Darby, a new impulse was given to this industry by Smeaton's invention, in which he applied with great advantage his blowing cylinders, worked by water-wheels, or by the atmospheric steam-engine; the first of these was erected by him at the Carron Ironworks, in Scotland, in 1760. This means of increasing the power of the blast in the furnaces was quickly followed by increased production of pig-iron.

Again, towards the close of the last century may be considered a new era in the manufacture of iron, when the steam-engine, the invention of Mr. James Watt, was made general in its application to the purposes both of pumping water from mines and for increasing the intensity of the blast. Cort's inventions, for which he obtained patents in 1783 and 1784, formed another important step in the manufacture of wrought from pig-iron, the first for puddling by which pig-iron is rendered malleable, and the second for substituting rollers for the forge hammer for drawing out the balls of malleable iron into bars. The foregoing advantages, together with the high price of foreign iron, largely imported, caused our manufacture to nearly double itself between the years 1788 and 1796, to which latter year attention is now directed. The return for 1796 was prepared for the House of Commons, when Mr. Pitt had it in contemplation to impose a tax on coal at the pit's mouth, and the returns were obtained from three sources—the Excise authorities, calculation, and lastly, the quantities really made. The works then existing in South Staffordshire and Worcestershire, with the number of furnaces and make of each works, are stated as follow, giving an average yield per furnace of 937 tons:—

Works.	No. of furnaces.	Excise.	Calculated.	Actual.
Bilston	2 ..... Tons	2,340	2,340	1,429
Bradley	3	3,640	3,000	1,920
Brierley	1	1,300	1,300	1,046½
Deepfield	2	2,600	2,600	2,526
Dudley Port	1	1,040	1,040	869
Gospel Oak	1	—	—	1,613
Graveyard	1	1,260	1,336	213
Level	1	1,560	1,560	1,391
Tipton	2	2,080	2,080	2,203
Total	14			13,210½

In the same year, 1796, the production of Great Britain, of 124 furnaces, amounted to 125,079 tons, of which South Staffordshire contributed upwards of 10 per cent. The returns for the year 1806 show a considerable increase, the 105 furnaces in blast in that year in Great Britain yielding 243,851 tons of pig-iron, the production of South Staffordshire being 47,592 tons, or an increase of nearly 400 per cent., when compared with the returns for 1796. The following statement shows the individual production of the ironworks in 1806, with the respective numbers of furnaces built and in operation:—

Ironworks.	Furnaces: built.	In blast.	Pig-iron.
Blower's Green	1	1 ..... Tons	2,436
Bilston	3	2	3,550
Bradley	3	2	2,566
Brierley	2	0	—
Brierley Hill	1	1	817
Caponfield	2	2	4,600
Deepfield	2	2	3,660
Dibsdale Bank	1	1	300
Dudley Port	1	1	1,196
Golden Cross	1	1	184
Gornal Wood	1	1	432
Graveyard	2	1	1,274
Gospel Oak	2	2	4,667
Level	3	2	3,351
Mill Field	2	2	5,000
Moorcroft	2	1	1,955
Netherton	2	1	1,500
Oldbury and Tipton	3	3	4,500
Park Head	1	1	1,404
Rough Hill	2	2	3,000
Toll End	2	1	1,200
Wednesbury	1	0	—
Total	40	30	47,592

The production of Shropshire and South Wales alone exceeded that of South Staffordshire at that period, the former yielding 54,966 tons, the latter 68,867 tons, while that of Scotland was but 22,840 tons of pig-iron. The next return from which information is obtained was prepared for the Government by Mr. F. Finch, formerly member for Walsall, and refers to the production in the years 1823 and 1830, when the number of furnaces in blast and pig-iron made in this district was as follows:—

Year.	No. of furnaces.	Pig-iron.	Aver. per furnace.
1823	81 ..... Tons	133,590 ..... Tons	1640
1830	118	211,604	1793

Showing an increase in seven years of 37 furnaces, and 79,014 tons of pig-iron, or an increase of 58 per cent. We have now reached a period when the hot-blast was coming into use, and the increased returns of subsequent years will show its great importance. This invention of Mr. Neilson was first successfully carried out in the furnaces in Scotland, and gradually spread into the other iron-making districts. It will be convenient for comparison to give the production of Scotland and Great Britain side by side with this district for a few years, as noted below:—

Year.	South Staffordshire.	Scotland.	Great Britain.
1830	Tons 211,604	Tons 37,500	Tons 652,417
1840	407,150	241,000	1,396,000
1847	320,320	539,968	1,999,608
1852	725,000	775,000	2,701,000

Having thus far traced the history of the industry in South Staffordshire and Worcestershire, we come to a period when the returns of production are obtained and published annually in the Mineral Statistics of the United Kingdom, from which the following statement is tabulated, showing the number of furnaces built and in blast in each of the years named, and side by side is noted the production of Great Britain for comparison:—

	South Staffordshire and Worcestershire.			Great Britain.
Year.	Furnaces: built.	In blast.	Pig-iron.	Pig iron.
1855	178	146	Tons 754,000	3,218,154
1859	184	123½	475,300	3,712,904
1863	200	110	691,157	4,510,040
1867	177	91½	515,638	4,761,023
1870	171	114	588,540	5,963,515
1871	163	108	725,716	6,627,179
1872	145	107	673,470	6,741,929
1873	142	99	673,397	6,566,451

Thus it will be seen that since the year 1855 the production of South Staffordshire has presented but little variation, while the production of Great Britain has during the same period increased twofold.

The following list of works, owners, and blast-furnaces in operation in the year 1873 brings this section of the enquiry up to date:—

Names of works.	Situation.	Owners.	Furnaces. Built.	In blast.
Barbor's Field	Bilston	Barbor's Field Company	2	2
Borereaux	Ditto	Jas. and Thos. Holcroft	2	2*
Bradley	Ditto	G. B. Thorneycroft and Co.	2	2
Deepfields	Ditto	Samuel Pemberton	3	2
Bilston Brook	Ditto	Bilston Brook Furnace Co.	2	2
Herbert Park	Ditto	David Jones and Sons	1	1
Prior Field	Ditto	H. B. Whitehouse and Son	2	2
Stonefield	Ditto	Stonefield Iron Company	1	1
Stow Heath	Ditto	W. and J. T. Sparrow & Co.	3	0
Millfields	Ditto	Ditto	3	1
Spring Vale	Ditto	Alfred Hickman	3	2†
Capponfield	Ditto	John Bagnall and Sons	3	2
Horseley Fields	Wolverhampton	Osier Bed Iron Company	3	1
Parkfield	Ditto	Parkfield Iron Company	5	4‖
Chillington	Ditto	Chillington Iron Co. (L.)	6	4
Gold's Green	West Bromwich	John Bagnall and Sons	3	1
Crookhay	Ditto	W. and G. Firmstone	4	2
Union	Ditto	Philip Williams and Co.	3	1
Corbyn's Hall	Dudley	Exors. of the late W. Matthews	4	2
Netherton	Ditto	M. and W. Grazebrook	2	2§
Park Head	Ditto	Evers and Martin	2	2
Woodside	Ditto	Cochrane and Company	3	3
Windmill End	Ditto	J. H. Pearson	3	2
Withymoor	Ditto	W. H. Dawes	2	2
Buffery	Ditto	John Jones and Son	1	1
Old Hill	Ditto	N. Highley and Sons	2	1
Corngreaves	Ditto	New British Iron Company	6	3
Old Level	Ditto	J. and C. Holcroft	3	2
New Level	Brierley Hill	Earl of Dudley	2	2
Lays	Ditto	W. and G. Firmstone	3	2
Shut End	Dudley	John Bradley and Co.	4	2
Corbyn's Hall, New	Ditto	Corbyn's Hall Iron Co.	3	2
Broadwaters	Wednesbury	Samuel Groucott and Sons	3	3‖
Darlaston Steel and Iron	Ditto	Darlaston Steel & Iron Co. (L.)	3	2
Rough Hay	Ditto	Addenbrooke, Smith, & Pidcock	3	2
Park, Old	Ditto	Patent Shaft & Axletree Co.(L.)	3	2
Willingsworth	Ditto	D. Kendrick and R. Pearson	3	1
Moxley	Ditto	David Rose	2	1
Priestfields, New	Willenhall	William Ward and Sons	2	1
Hatherton	Walsall	G. and R. Thomas	2	2**
Pelsall	Ditto	Pelsall Coal and Iron Co.	2	2
Greenlanes	Ditto	Walsall Iron Co.	2	1
Bentley	Ditto	Chillington Iron Co.	2	2
Willenhall	Ditto	Fletcher, Solly, and Urwick.	3	3
Tipton Green	Tipton	Roberts and Co.	4	4
Hange (Tividale)	Ditto	Round Brothers	2	2
Park Lane	Ditto	John Colbourn and Sons	3	3
Horseley	Ditto	Ditto		
Tipton	Ditto	J. and T. Turley	2	0
Wednesbury Oak	Ditto	Philip Williams and Sons	3	2
Groveland	Smethwick	G. H. Hickman	2	2
Coneygre	Dudley Port	Earl of Dudley	3	2
Dudley Port	Ditto	J. and G. Onions	1	1
Stour Valley	Ditto	Ditto	1	1
Total of South Staffordshire and Worcestershire			142	99

* One furnace for 9 months. † One furnace for part of the year only.
‡ Three furnaces for 9 months, and four furnaces for 3 months.
§ Six months only. ‖ One standing 3 months for repairs.
** One in blast 8 months.

IRON ORE USED IN MAKING PIG-IRON.—The "Native Mine," or clay ironstone of the coal measures of this district, if alone employed, would require from 54 to 55 cwts. of uncalcined ore to each ton of pig-iron made, a smaller quantity being required when the richer ores used in admixture are employed. It has been ascertained approximately that in the years 1872 and 1873 the quantity of iron ore used in making 673,470 tons and 673,397 tons respectively, amounted to about 1,800,000 tons in each year, the following districts furnishing quantities in the proportion given:—

Districts.	
South Staffordshire	Tons 600,000
North Staffordshire	550,000
Lancashire	55,000
Northamptonshire	230,000
Oxfordshire	19,000
Various ores	206,000
Forge and mill cinders	140,000
Total ore	1,800,000

The quantity enumerated as "various ores" includes ores from Wales, Warwickshire, Gloucestershire, and elsewhere, but it has not been found practicable to distinguish the proportion received from each district. As previously stated, the "Native Mine" of this district yields an average of 37·15 per cent. of metallic iron; the ironstone of North Staffordshire, 36¼ per cent.; and the Churnet Valley ore, a calcareous brown hematite, nearly 37 per cent. The Northampton and Oxfordshire ores of hydrated peroxide, so valuable in admixture with the coal measure ores as a flux, arising from their highly silicious character, yield 40 per cent. of metallic iron. The hematite of Lancashire, about 64 per cent.; and the forge and mill cinders, probably not less than 50 per cent.; these cinders are largely employed in the production of common hot-blast pig, while the best mine-pig, for which Staffordshire is so justly celebrated, is made from "Native Mine," and other selected ores, coal previously coked, and cold air in the blast-furnace.

COAL USED IN MANUFACTURE.—In the beginning of the present century the average quantity of coal required in the manufacture of a ton of pig-iron was little short of 10 tons. About the year 1810, as stated by Mr. David Mushet, in his valuable papers on iron and steel, half this quantity enabled the ironmaster to produce a ton of pig-iron; it will be understood that in each case referred to the coal used included all purposes where heat was required, calcining the ores, &c. When Mr. James B. Neilson, in 1828, was successful in employing hot blast at the Clyde Ironworks, further economy in this direction was secured, and it may be interesting to note that it was at these works that Mr. D. Mushet commenced his professional career. In the year 1840 it was determined by Mr. William Jessop, of the Butterley Ironworks, in Derbyshire, who instituted a careful enquiry on this point, that in South Staffordshire 3 tons 17 cwts. of coal were employed to each ton of pig-iron, the average quantity used in Great Britain in the same year being 4 tons 1 cwt. Advancing to the year 1869, when the Royal Coal Commission reported on this important question, a further economy had been secured, 3 tons only being required. Again, in the years 1871 and 1872 the average quantity of coal used per ton of iron in this district, as ascertained by the Mining Record Office, was 58 cwts. In Great Britain the average consumption of each year did not exceed 51 cwts., and in Scotland, where raw uncoked coal is principally used, the average was equal to 55 cwts. of coal to each ton of pig-iron made. In many of the districts previously considered the waste gases are to a great extent utilised, and much economy secured; here, however, in this district comparatively few furnaces are provided with gas-saving apparatus. Of the coal employed in iron making, the "Thick coal" and the "Heathen coal" are the most important, the former giving when coked 54 per cent., with 0·31 of sulphur and 4·18 of ash, the latter between 40 and 45 per cent. of coke, 0·51 of sulphur, and 4·58 of ash. Generally in the district the coal is used partly raw and partly coked.

LIMESTONE AS A FLUX.—In addition to the silicious ores brought into the district from Northamptonshire, which are used in admixture with the ores of the district as a flux, there is also largely employed the Silurian limestone of Dudley and Wenlock Edge, and carboniferous limestone from Derbyshire and North Staffordshire. The following shows the composition of the limestone from the quarries at Dudley and Park Head:—

Samples dried at 212° Fah.

	Dudley.	Park Head.
Carbonate of lime	97·31	97·10
Carbonate of magnesia	1·00	0·85
Carbonate of iron	0·62	0·60
Clay and sand	1·27	1·15
Organic matter and water	0·20	0·30
Total	100·40	100·00

MILLS AND FORGES, BESSEMER WORKS, AND COAL EMPLOYED.—The malleable ironworks of this district are by far the most numerous and the variety of manufacture the most varied, of the iron-producing districts of Great Britain, including heavy ironworks for railways, pit chains, cables, anchors, and the different forms of iron fashioned from the rolling and slitting mills. The importance of the district will be readily seen by comparing its powers of production with that of Great Britain for a few years. A detailed list of the mills and forges of this district will be found in the "Mineral Statistics of the United Kingdom" for the year 1873, p. 111:—

	South Staffordshire.				Great Britain.			
Year.	No. of works.	No. of puddling furnaces.	No. of rolling mills.	Total mills and forges.	No. of works.	No. of puddling furnaces.	No. of rolling mills.	Total mills and forges.
1871	122	2037	320	2357	267	6841	866	7707
1872	125	2155	329	2484	276	7311	1015	8326
1873	124	2145	327	2472	287	7264	939	8203

The Bessemer Steelworks of the district are represented by the Old Park and Brunswick Works, both situated at Wednesbury, and consisting of four (3-ton) converters at each works, giving a united capacity of 24 tons. In considering the question of the consumption of coal in the malleable iron and steel works of this district, although great care has been taken to ascertain the quantities used, it has only been possible to arrive at an approximation, and it may be generally stated that the average quantity used in a puddling furnace working regularly throughout the year varies between 800 and 900 tons, or an aggregate annual consumption in the district in these works when in full operation of not less than 2,000,000 tons of coal, in which quantity is included that used in the tin-plate works, and for all purposes where heat may be required.

TIN-PLATE MANUFACTURE.—The iron employed in this industry is made from the best cold-blast mine, refined in the first instance with coke, and subsequently with charcoal, afterwards beaten into flat plates by the tilt hammer, and again heated and rolled until the requisite thinness is secured; in these operations a loss of from 3½ to 4 cwts. of metal is incurred in every ton. Great skill is required in the process of tinning (the value of tin in 1873 being 133*l.* per ton); it will be seen how important it is to observe economy by careful working. It may be stated that a box of tin-plates, 10 in. by 14 in., of 225 sheets, consumes about 8½ lbs. of tin in the process of tinning. The following firms engaged in this industry have been long established, and enjoy a wide reputation for the superior quality of plates manufactured:—

Name of works.	Name of firm.	Where situate.
Bradley	Thompson, Hatton, and Co.	Bilston.
Broadwaters	Ditto	Kidderminster.
Brockmoor	Budd and Co.	Brierley Hill.
Cookley	John Knight and Co.	Kidderminster.
Hope	Hope Iron and Tin Plate Co.	Tipton.
Horseley Fields	Osier Bed Iron Co.	Wolverhampton.
Rugeley	Vacant	Rugeley.
Stour Vale	Crowther Brothers and Morgan	Kidderminster.
Tividale	Budd and Co.	Tipton.
Wilsden	E. P. and W. Baldwin	Wolverhampton.

The aggregate production of the above works of tin-plate amounted in the year 1873 to about 215,000 boxes, of a total weight of not less than 14,000 tons. The fuel used in these works has not been separately ascertained, being partly coal and charcoal, but is included, as previously stated, in that used in the mills and forges.

In Great Britain in the same year we find 60 firms engaged in the manufacture of tin, terne, and black plates, the production being 2,685,045 boxes, of an aggregate weight of not less 165,000 tons.

In conclusion, it may be observed that recent commercial reports referring to the iron industries of South Staffordshire tend to show a diminished production of pig-iron for the past year; the same may be said of the mills and forges which have not been working full time. The sheet makers, however, are fairly well employed, having contracts on hand that will ensure active operations for some time to come.

[CORRECTION.—In the article in last week's Journal, on "The Iron Industries of South Staffordshire and Worcestershire," in the first column, third line, omit the word *or* before underlying rock; and in the second column, for *reduction* of ironstone, read *production* of ironstone.]

THE GENERAL EXPENDITURE ASSURANCE COMPANY.

SIR,—I have rarely seen a greater tissue of blunders than that in a letter of a correspondent of the Journal some weeks back respecting the above company. The letter in question is headed, "A Bird in the Hand is worth Two in the Bush," and the objections contained therein are most superficial and trivial. There is the less excuse for this as the writer would seem to be by no means unacquainted with the business and the ways of the world. "A Bird in the hand," just as many others, objects "to try and get your discount on the spot at once, and invest it yourself," plausible to stupid or ignorant people, but will not hold water at all if looked into, in proof whereof I may state that a few days since, paying bills very recently incurred in a large town where my credit is good, I received out of 20*l.* in various payments just 8d. discount; none of the bills varied two months. I wonder if the gentleman in question would like to ask for discount on a necktie or a pair of gloves, or six pennyworth of grocery. I could not get it on bills of 7*l.* and upwards. By the General Expenditure Assurance Company's plan you get discount on every purchase, however trivial, on your entire expenditure. Again, what cavil can there be as to the far-off period of the redemption of expenditure, when the company guarantees annually to pay the premium on policies of assurance in any company on receipt of a proportionate number of bonds of the company. But, as for the period of redemption of expenditure being so remote, does not the ordinary insurer of his life look forward to

a very remote period for the payment on that policy to be made to his friends—perhaps, should he be a young man, 40 or 50 years, or more. But it seems to have been overlooked that there is the power of rebating one's bonds after three years—*i.e.*, on the bonds being given up to the company a certain proportionate cash sum will be handed over in exchange, just as in the case of giving up any ordinary policy of assurance. Here, then, is a comfortable little sum in store against a rainy day, obtained without other trouble, inconvenience, or cost save of paying ready money. The numbers of London and other tradesmen of standing that have joined since the starting of the company, and numbering now some 1300 or more, is a sufficient proof that the plan is well thought of. One interim dividend has been already paid, and the first ballot comes on in a few days. ——— A DIRECTOR.

COLLIERY ACCIDENTS, AND THE LESSONS THEY TEACH.

SIR,—In reading your article in last week's Journal on this subject, and in that part referring to the Mirfield Coal Company and shaft sinking, I was rather surprised the writer did not point out more clearly wherein the "error of judgment" lay in that case. I was also surprised at the time of the Coroner's enquiry that Mr. Wardell did not point out the absurdity of men (called colliery managers) blowing air down a pipe into a sinking shaft, where they know they must necessarily meet with carburetted hydrogen, and the shaft must in such cases become the upcast; and in this case it would be about 15 times the size of the pipes (the downcast). In all such cases as those the pipes—or, what is much better, a partition—should be the upcast, and the shaft wherein the men are working and passing up and down should be the downcast. The reverse is the real error of judgment, and a practical colliery manager would never think of adopting such a method, which is contrary to all common sense; and yet neither the writer of your article nor Mr. Wardell mentions this. ——— A COLLIER.

AMERICAN MINING.

SIR,—The signs of the times are evidently in favour of Pacific Coast Mining, but the English capitalist requires to be reassured, and nothing will more certainly conduce to that end than the solid success of those enterprises in English hands which are now being prosecuted there. It will soon come to be generally understood that even those mines which have acquired so much notoriety were badly abused both in the administrative and executive departments. The estimates of their capacity for produce upon no better foundation than the assumption that what was really a deposit, and might easily have been determined to be so, was taken as a representative section of the entire claim, and to extend indefinitely downwards, and that it was only necessary to sink and stope as circumstances might require to supply reduction works on almost any scale which might be determined.

The success of the Richmond, and the improved prospects it holds out in depth, and the satisfactory way in which the Eberhardt and Aurora is opening up go to show that mines must be prosecuted as mines, and not at random, and who knows but that the Emma may yet turn out to be a good mine. There are conflicting opinions concerning that mine, but the more weighty appear to be in its favour as a mine, but not as a million pounds sterling bubble. The audacity and infatuation which originated, fostered, and subscribed to that scheme is a stain upon the escutcheon of two hemispheres not likely to be soon obliterated. Experience is a good teacher, and if its value were determinable by its cost the Emma episode must have added largely to it.

There is a certain ruggedness in the realm of facts which does not exist in the regions of fancy, and natural inclination predisposes to what is most agreeable. The groundwork of mining is a system of facts, and from which fiction ought always to be excluded. It has, or should have, facts to begin with, facts to proceed with, and facts to end with. And whenever there is a departure from these the pursuer is at sea in the dark, without compass or chart to guide him. It is a fact that the Pacific Coast region is rich in the precious ores, and it is also a fact that Nature has disposed them in such a way as to leave scope for the full play of human energies in their extraction. It seems as if Nature has a direct reference in all her works and productions to human intelligence, intending her richest rewards for those most persevering in its exercise, and at the same time she constitutes herself the standard of appeal for its guidance. This view unmistakably points to experience, and experience reverts to analogy, the province of which is retrospective and inferential. It looks to the past to enlighten the present and direct the future. The utility of scientific knowledge is of real value only as it can be practically applied; on the other hand, practical knowledge is valuable in proportion as it can be scientifically demonstrated.

Pacific Coast mining—I speak of Nevada in particular—requires only ordinary precautions to secure for it a measure of success which would be as satisfactory and gratifying in the future as the past has been disappointing. But if promoters and investors will persist in neglecting to have recourse to precautionary measures, similar disasters, although they may be reduced to a smaller scale individually, may be expected to again and again repeat themselves. If the foundation be not properly laid the superstructure erected thereon cannot be depended on for its stablity.

If segregated rocks violently torn asunder by the disruptive forces which rend the solid crust of the earth, and cause its whole framework to vibrate with tremulous emotion to its centre are pitched upon as the most inviting points simply because the elevated masses contain sections of auriferous or argentiferous minerals exposed to view, or those infiltrations of metalliferous ores which are found in cavernous limestones, and appear to be as exclusive in their situations as a "fly in amber," or as "water in a bottle," are relied upon as the sources of permanent wealth they will fail, and fail alike those who rely upon them. Mr. Robert Hunt has given expression to a very pretty sentiment in his "Poetry of Science"—"The true is the beautiful"—which miners would do well to make a note of, inasmuch as veritable truth and real beauty are as closely allied in mining as in any other exploratory department of Nature's vast realm.

The character of English mining has been somewhat impugned of late, and not, we fear, without some reason, but there is a way to redeem it, and that is by practical re-assertion on old principles. I do not mean by this a return to old methods, but to the principles which pertain to mining as a business. That system of exclusive reference to the merits, without which its intrinsic value cannot be determined. The adaptation of applied means, which its frequently varying circumstances require. A recognition and acceptance of actual facts contemplated by the eye of reason and knowlege, and which disregard the intrusions and prepossessions of the fancy. Applied mining on a basis of natural, practical, and scientific facts, instead of artistic theoretical elaborations on paper, furnished by the imagination, to ensnare the uninitiated and unwary. But wasteful and abortive schemes are not confined to foreign parts; there are some in this country, notwithstanding the lengthy experience it has had in mining. Things within the circle of my knowledge are kept afloat, and in some sort of intermittent motion from month to month and from year to year, and it is difficult to conceive with what object or hope of success. If there be no definite object, and no speculative exploration prosecuted towards a possible one, what is the use of spending money? What satisfaction can accrue from finding oneself at the same point from day to day and from year to year, with the recurring consciousness of being poorer by the amount expended, and further off from realising anything by the time which has elapsed, for time under such circumstances may be reckoned inversely in connection with a reduced exchequer? If it does not bring nearer an object it interposes a barrier which in effect removes it to a greater distance. Whatever may be the motives which actuate such follies, it is clear to my mind that no one can be benefited besides the officials and employees, and when these consist, as they sometimes do, of ramified family connections, any reasons arising from that consideration only add additional weight to the opposite scale.

To spend comparatively large sums of money from year to year for the luxury of waiting for something to turn up looks very much like discounting "Micawber." But such is the hopeless condition, the dying life or protracted death of some mining schemes, which are projected but not prosecuted within the confines of Great Britain. A preference has frequently been shown for home mining on the ground of its availability for closer supervision, but of what use is a heedless supervision. The eye may circumscribe an object within its range, and the mind retire from the view wholly unimpressed by it, or if it receives an impression it may be an unintelligable one, which never gives birth to an idea, nor sheds upon the mind the faintest ray of light.

The man who cannot comprehend and generalise—that is to say, who cannot define an object dimly outlined in symbol, and infer therefrom with approximate exactitude its nature and value—is not qualified to engineer and direct the exploratory operations in mining. Many a man is fully able to execute the behests of another who could never mirror a pathway for himself amid the darkness which surrounds the treasures that lie embosomed in the rocks beneath us, and hence it is that so little progress is made; and too frequently what there is is retrogressive from being prosecuted in wrong directions or towards valueless objects. Some men who are destitute of proper qualifications poise themselves on the quantity of cunning which they assiduously cultivate. They take stock of the idiosyncrasies of the party to whom they are amenable, whether it consists of a board of directors or a single managing director, and according to their estimation of those is their course planned and practised. They have no light within themselves, and that which surrounds them and illuminates others serves only to deepen and degrade their darkness. It matters not in what part of the world mining may be prosecuted; there is but one absolutely right but many wrong ways of doing it. ROBT. KNAPP.

Llanwrst Mines, July 20. ———

MINING IN COLORADO—THE TERRIBLE LODE COMPANY.

SIR,—The Journal of June 12 is just received. I cannot see that "Shareholder" has refuted any of the statements made in my letter of May 12, and published in the Journal of June 5. I then said that the shareholders were led to believe by the notice in the Journal of April 17 that the mine was at that time working as usual, and that trouble was simply anticipated, whereas the mine was really stopped, and it was not until May 1 that a notice of the true state of affairs appeared. What I then complained of was that a proper statement was not given in the Journal of April 10 instead of waiting three weeks before doing so. Even the notice of May 1 is not, strictly speaking, correct, for it states "Served with an injunction signed by a local judge." The judge cannot be called a local judge, when he is one of the judges of the Supreme Court of the Territory of Colorado, and is appointed by the President of the United States of America. The notice further states "the injunction and order are issued in direct contravention of American law." This is not correct, as it is no contraventiion of the law to grant an injuncion on *ex parte* application, and the case of the Terrible Company is not the only one in which the same thing has been done, but with regard to the order for delivering up possession the judge, probably, did overstep his authority.

"Shareholder" states that I am not a shareholder, which I suppose is to throw discredit on my other statements, which he has not and cannot deny. But I again assert that I am a shareholder; my shares, however, stand in the name of Peter Le Neve Foster, and I have the necessary writings from him to show that the shares are mine, and he simply holds them in trust for the purpose of more easy transfer. This, of course, "Shareholder" could not know, but he might easily have concluded from the similarity of the names, and my statement, that I had spoken the truth.

In conclusion, I think "Shareholder" must find some better answer before he can screen the fault, and then why not use his own name, nstead of making a show of defence under cover of a *nom de plume*?

Georgetown, Colorado, July 2. ERNEST LE NEVE FOSTER.

RUBY CONSOLIDATED MINING COMPANY.

SIR,—Referring to the note at the foot of your correspondent's (Mr. Emersley) letter from Eureka, June 24, appearing in the Supplement to the Journal of Saturday last, on the subject of this company's property—the Dunderberg Mine—I am instructed to inform you that the same has never been parted with by this company, whose property it is, and that steps are being taken in San Francisco to compel its legal restoration to the attornies of this company by the parties who have illegally attempted to defraud the shareholders.—*Finsbury, July* 20. M. AIKMAN, Sec.

FLAGSTAFF SILVER MINING COMPANY.

SIR,—I find that the alarming apprehensions foreshadowed by "A Shareholder," in last week's Journal, are but too true, and after having entrusted our affairs into the hands of those in whom we thought we could really place implicit confidence it is, at least, strange conduct that outside shareholders should be unnecessarily so long kept in cruel darkness. From the great and sudden depression that has taken place in the quotation for the shares it is pretty clear that privileged shareholders must have obtained by some means the long-looked-for information, and forced the sale of their shares.

We certainly are fairly entitled to know whether those directors who have just resigned, and thus left the sinking ship, sold their shares before doing so, and also whether our Chairman still retains the large interest he held at the last meeting.

If Mr. Woodifield's report is so unquestionably unsatisfactory, why are we not apprised of the fact? Why the delay? Is the reply to be found in the daily declining price of the shares?

July 21. ——— A SHAREHOLDER.

THE FLAGSTAFF MINE.

SIR,—The silence of the board in reference to recent important events induced me to make personal enquiries at the office upon the matters referred to by "A Shareholder," in the Journal of last week. I asked the officials whether the advices just received from the mine were or were not to the effect that the mine was now "gutted," owing to the manner in which it was being worked while in the possession of Mr. Davis, and as to the late resignation of half the board, including Sir Leopold Heath; but they would not reply in detail to my questions, and all I could get from them was the general remark that "our affairs were never in a worse position than at present." The Emma shareholders are not so unfortunate as we, for they have possession of their mine. Surely, Sir, the shareholders ought to be called together immediately.

July 22. ——— ANOTHER SHAREHOLDER.

FLAGSTAFF MINE.

SIR,—The shareholders of this company have great reason to complain of the directors for keeping them in ignorance of what is being done with their property. I have made enquiries at the office myself more than once, and have found the officials knowing, or feigning to know, less than outsiders, and even the scant information I have obtained from them has afterwards proved to be incorrect.

The last circular the directors sent out is dated April 20, and states that "Mr. Woodifield, one of the directors, leaves for Utah to-morrow to inspect and report upon the mine, with a view to carrying out the provisional agreement with Mr. Davis." This report was promised to be sent to the shareholders immediately on its receipt; and as the mine can be reached from London in 15 days, and allowing a week for the inspection and preparation of the report, with another 15 days for it to be sent home, we ought to have had the report in our hand by the end of May, or six weeks ago; the board have not, therefore, kept faith with their constituents, and if the rumour is true that some have resigned I shall welcome the change, hoping my co-shareholders will quickly fill up their places by men who will have the courage to take the shareholders into their confidence at all times, and were I candidate for a seat at the board I would make it a point that a report should be sent monthly to the *Mining Journal*, for the information of every shareholder of what has been done during the month.

It is perfectly evident that the directors' silence arises from the gloomy character of Mr. Woodifield's report, and as the mine has not been worked for some months past, and all the o re is stated to have been extracted, leaving only fresh explorations to be made, the future does indeed seem depressing; nevertheless, I shall stick to the company, which has been previously, and more than once, in as depressing a condition as it now is, and yet has recovered, for I believe that with a good working board, meeting more frequently than once a fortnight, as is now the custom, getting rid of weak holders of stock, who only play into the broker's hands, raising sufficient money by debentures to pay off Mr. Davis, the mortgagee, and to make explorations and developments in the mine, we shall make a good thing for ourselves, especially those who buy at the present market price.—*July* 22. AN INDEPENDENT SHAREHOLDER.

THE RICHMOND MINE.

SIR,—The attacks that have been made on the market price of these shares have a certain amount of truth in them, but there is nothing in them, as I wish to show in a few words, to lessen the confidence in the mine of those persons who have bought their shares for an investment. It is perfectly true that a considerable number of shares have been sold by *bona fide* holders, who had complete confidence in the future of the mine. I know one gentleman who sold 1500 shares, and another who has sold 1000 shares, but they have both of them instructed their brokers to buy them back at 10. The fact is that the shares were too suddenly run up, and run up too high for what the present produce of the mine justifies, but it can easily be shown that Richmond shares at 10 will pay the purchaser from 20 to 25 per cent., and, therefore, will pay the original shareholders from 40 to 50 per cent. From 10 to 11, therefore, is the price at which the old shareholders will come back and hold firm at. A considerable number of shares are undoubtedly at the present moment in the hands of weak holders (speculators), and liable to panics, which accounts for the absurd fluctuations in price which we have seen within the last fortnight.

July 21. ——— ONE BEHIND THE SCENES.

RICHMOND CONSOLIDATED MINING COMPANY.

SIR,—When unprincipled and unscrupulous people are paid in coin by the same class as their own in principle, they stop at no lies to accomplish the ruthless and diabolical object for which they are employed. The ruin of the widow, the orphan, or the unguarded is no matter to paid scribblers of this character. Now, is it to be supposed for one moment that they incur the expense of printing and postage of such deceptive canards out of pure friendship to those they have never seen or known except by arriving at their names and addresses from a list of the shareholders of the company whose stock they mean to attack by depreciating the property by the most barefaced, impudent, though plausible falsehoods, to scare the holders to sacrifice their property to fill the pockets of the employers of these pests of society by their advice to part with their shares at any loss? By only one moment's calm reflection, the object of these paid scribblers would be obvious even to the most unguarded. It is the country people these paid deceivers count upon ensnaring in their net. Another sort of trade they adopt: they continually advertise shares in some particular company for sale at a ridiculously low price to catch the unwary in supposing they are going to obtain a prize some 20 or 30 per cent. below their market values. The unguarded in the country are the very people they catch, and when once parted with their money never see a share. There is a clique of these pennyless fellows in London—a branch at the West End, also in the City, and when applied to personally are *non est*, for fear of the strong iron arm of the law; yet, to beguile, they have their offices under a cloak of respectability, and a poor, miserable wretch (so-called clerk), to inform you the scamp you want "is out of town." Be guarded, fellow shareholders, of these "catch-penny circulars" you receive to frighten you into selling your shares and induce you to buy rubbish. Our company have been highly favoured with the attempts of these contemptible entrappers. They are watching you most carefully, and their employers the "bears" are on the alert for you. Be on your guard to commit all such circulars to the flames. Richmond shareholders, more particularly country ones, beware of these lying impostors who, having neither character or money, stick at no defamation to achieve their object—viz., to victimise you.

A RICHMOND SHAREHOLDER "ONCE CAUGHT."

United Service Club, London, July 22.

THE JAVALI AND CHONTALES MINES.

SIR,—In answering "Investor's" letter, in the Journal of July 10, and his remarks that my comparisons were unfair, untrue, and misleading, I refer your readers to "Investor's" first letter, May 22, and the following statement, "or the Chontales quotation is absolutely above the actual value of the shares" Do you not think, Sir, that it was very unfair of "Investor" towards the neighbouring mine to make such remarks? In my reply of May 26, with fairness, truth, and without misleading, I particularised the differences that existed between the two properties, and why the public had confidence in ours. I may add that one of your correspondents, "A Javali Admirer," considered my letter decidedly fair. "Investor" goes on to say "what I object to in his and other letters on this and similar questions is the tendency of the writers to leave the region of solid ascertained facts, and deal in speculative statements as to what may be expected." In the letters written by me there is the absence of drawing conclusions otherwise than from solid results. Our profits of last year I gave (nearly 4000*l.*)—nothing speculative about that; the facts stated of the number of stamps completed, and the crushing power they are equal to—what is there speculative or misleading in that? If we had not had the opportunity of judging of the capabilities of the stamps, and what quantity they were equal to crush; but after some years' experience surely we are enabled to state what are the capabilities of 42 stamps without indulging in the speculative. Why we have not crushed more during that portion of the present year has arisen from a difficulty in the question of labour, and at the present time it is considered to have been overcome. I referred to it in my letter of June 29, and that the difficulty arose from having employed a native contractor, who has been getting a large profit out of the native labourers, and their not caring to be employed by him has been the reason for our not having for some months past been able to crush more tons than we have by an arrangement that has been made now. Superintendents of labour were sent out in January last, and through them the manager considers the difficulty overcome. I leave it to your readers to draw their conclusions as to whether with 42 stamps we shall not be able to crush a much larger quantity now that the wet season has set in.

I trust this explanation will conclude the correspondence. W. B. P.

Bristol, July 19.

JAVALI MINE.

SIR,—If the shareholders in this gold mine will only wait for the setting in of the rainy season, now due, they will find the wisdom of this advice. There is, by last advices, 3000 tons of ore, which now lies ready for crushing, and this mass is daily being added to. Capt. Sohns has stated that untold quantities of this gold-bearing quartz is to be found on the spot, averaging, as proved, just 10 dwt. per ton—sometimes more or less. This produces 6*l.* per ton at the lowest, as a result of stamping. The number of the stamps is being greatly increased—2000*l.* per month need not be considered an over estimate, when plenty of quartz is obtainable, the mine having already returned 1600*l.* Javali must prove an ultimate success in spite of adverse criticism, and it would be mere folly to sell any shares at this moment, because for numerous reasons the manager could not crush his ore. That the ore is there there can be no question of doubt; a little patience, and results will satisfy the most sceptical. I have read last week's letter on this mine by "Discriminator." I am inclined to believe that he himself is the seller of Chontales and a buyer of Javali, in spite of his letters. ANOTHER DISCRIMINATOR.

London, July 22.

DOUBTFUL MINERALS, AND DOUBLE NOMENCLATURE.

SIR,—In the *Chemical News*, Oct. 2, 16, Nov. 13, 20, 27, Dec. 18, March 5, April 9, July 9, and (by an Editorial stratagem, for which I freely pardon you) in the *Mining Journal*, Nov. 28, Dec. 12, 19, March 13, 20, and April 30, has appeared a rather long and tedious correspondence under the above unusual heading; a subject from any one point of view of very grave importance to mineralogical students both of the present and of the time to come.

As far as I know, there is no surgical or other operation that can successfully remove a prejudice unless the operator is prepared to fit another (like an artificial tooth) exactly into its place—an accomplishment, I take it, not so very easily acquired. In this kind of dentistry I am not at all an adept, and I am not a caterer of substitutions. The correspondence has, however, resulted more satisfactorily than I had reason to expect. Critical observations (anonymous and otherwise) have rendered me essential service, and the critics, one and all, have my very best thanks.

Having revised to the hour my "Index to Mineralogy" of 1867, and taken as a standard Prof. Maskelyne's List of the Minerals in the British Museum (as far as it goes), I propose to make the differing names of all other authors subservient to *it*, and to accompany my new list of minerals with a dictionary of English and other

synonymes, in order that something like uniformity of mineral nomenclature may in the future prevail. The labour has been anything but light, and I am truly glad to use my antiseptic initials for the last time on this, to many of your readers I can fancy, very sticky subject. A Mineralogical Society of London is hinted at, and a Mineralogical Society of London is easily possible.

I glory in being the champion of our own mineralogists. I am prepared to back them against the whole world. Appearances only are against them. The mineralogical standard is floating languidly elsewhere; let our Maskelynes, Smythes, Forbeses, and other followers come to the front and take it. It can be done in a jiffey.

London, July 20. T. A. R.

THE DIVINING ROD.

SIR,—In my communication to you last week on this subject I am (by a singular omission) laid open to the censure of the malicious, consequently I ask a small space in your next issue for setting myself right in this matter. In the first paragraph, line 25 and 26, we have as follows:—"The rod in some form was held sacred by the Greeks, for we find that Proserpine," &c. This should read thus:—"The rod in some form was held sacred by the Greeks, *as seen by the olive branch of Athena, also by the Latins*, for we find that Proserpine," &c. The words in *italics* being left out makes considerable difference in the value of the reference.

If those who pride themselves on their proficiency in the use of the dowsing rod will come forward and show their ability, I have no doubt that we shall have such evidence as will convince some sceptics, and stagger a good many more. This is a question which can only be decided by experiment; and preparatory to this I would ask you to invite all who believe they have any evidence to bring forward to bring such forward through the columns of your widely-extended Journal. I think if this is done there will be some reason made very apparent why so many continue to believe in the power of the divining rod, which appears as old as man's existence on the face of the earth.

Rabbi Levi I believe it is who asserts that "The rod of Moses was created on the evening of the Sabbath, and delivered to Adam in Paradise; that it was handed down by him through Enoch, Noah, Shem, Abraham, Isaac, Jacob, and Joseph; that it was stolen after Joseph's death on the general plunder of his house, and planted in the garden of Jethro, and that on Moses seeing it, and observing the characters graven thereon, he put forth his hand and took it."

Your readers may believe or disbelieve the above story; and it no less shows the high repute in which this rod has been held. The divining rod, having been deeply graven on the human mind from the earliest ages, has never yet been obliterated therefrom; it once held potent sway, and has not yet wholly lost its power. What other human institution, invention, establishment, or idea can be thus clearly traced, as continuing through all ages, and running through the thought of all time? If it has no other power then, it still retains those high associations, and these give it a power not easily laid aside or stamped out. We see this power associating the rod, said to have been created in Paradise, the rod of the Egyptian magician, the olive branch of Minerva, the golden bough of Æneas, the divining rod of the Scythians and of the Germans, the rod of Circe, and the wands of the fairies, which the poets have created as the inhabitants of many strange places, the misletoe of the Druids, and the lotus of the Hindoo. We see all these connected (as by a silver cord running through all ages) with the dowsing rod of the present time. Can we say, then, that there neither is or shall be any law or secret power in Nature which, if discovered, will satisfactorily explain this, and that it altogether amounts to nothing more than a freak of the human mind? If so, it is singular indeed, and is, I believe, the only instance we have of such a freak of the human mind.—*Redruth, July* 20. W. TREGAY.

THE DIVINING ROD.

SIR,—Diffidence, in the face of so many adverse opinions, prevented me disclosing my experience, or rather what I witnessed in my own case, with the divining rod. Mr. Tregay's admirable letter, in the Supplement to last week's Journal, has, however, encouraged me to unfold what I witnessed some few years since. A shodestone was found on the estate of Mrs. Harries, of Fishguard, in the parish of Llanfern-nant-gwyn, Pembrokeshire. I found no difficulty in obtaining a tack-note. I had with me at the time one John Davies, a first-rate miner, whose residence was near Devil's Bridge, Cardiganshire. He and his chum I set to work to run a trench in the field the stone was found, going east and west 11 chains, and to a depth of 6 ft., also across the head land north and south, without success. The miners then collected their tools to leave, when suddenly John Davies cried out, "I'll try the twig!" and, no sooner said than done, he went to the hedge close at hand, cut a forked hazel twig of the second years' growth, and commenced what I considered a most arduous task. Going along the east boundary, then the north, and in going down the west side about five chains the twig bent downwards. "Ah!" said John, "there is something here, water or mineral." The spot not being favourable for sinking bearings were taken to the south sides, and the following morning a trial pit was sunk, and in two hours came on the back of a splendid quartz lode. The water was powerful throughout the sinking, having a mill leet on the south, and a fine little stream a few yards north, which caused our removal. I am now successfully mining on the other side of the boundary of this estate, and many in the neighbourhood witnessed the effect caused by the twig, and are still living.—*Crymich.* Y' GWYR.

THE DIVINING ROD.

SIR,—While the dowsing rod question is being discussed in your valuable Journal I would be glad if anyone who is up in this science would give us first a description of the rod, the manner of using it, and what lodes have the greatest, or quickest, effect on the lode, whether copper, tin, or lead, or if there is any difference in an east and west or north and south lode. ENQUIRER.

Holywell, July 21.

THE DIVINING ROD.

SIR,—Witchcraft and alchemy have long since been considered as utterly mistaken ideas, except where clung to by the ignorant of the ignorant, in Wales, Devon, and Cornwall. No intellectual mind can admit their reality for a single moment, and all concur in stating that only the blind belief in the mysterious could ever have kept these superstitions their hold on the enlightened intellect. If we are to believe, as some of your correspondents do, that divination is in effect a strong power yet, we must place ourselves on a level with the credulous believers in witchcraft. Now, I have a decided objection to this, and I do not at all consider myself bound to believe in everything I cannot refute. In all ages man has been prone to prefer darkness to light, and a love of the mysterious is one grand characteristic of savages. Shall we, then, by imitating them lower ourselves, who have the benefit of science and learning, to their level by placing confidence in idle and vain impossibilities? Is antiquity a test of truth? Astrology has been a favourite idea for many centuries, but it is none the less untrue and delusive for that, and even if Adam had come into the world divining rod in hand we would not feel ourselves bound to believe in its power. Ignorance fosters superstition, and where the few are enlightened only they have as an object the keeping the many in ignorance.

The divining rod is believed in now only in Cornwall, and until very lately this county has been remarkable for ignorance. When the people get any knowledge of science they will discard the chimera, and will know better than to centre their hopes on a hazel twig. Nothing is a greater mistake than the comparing the dowsing rod to a blade of grass or leaflet. We do understand the growth of vegetables; we understand the grand principle of a compensative Nature, of the benificence of the Creator, but we understand or admit of no connection between that Creator and the dowsing rod. Science, which now-a-days determines every sane man's belief, says of the divining rod and all such notions, "It cannot be," and unless anyone is prepared to prove that the ancients were higher than we are in the scale of civilisation, we are bound to believe what science teaches. The man who supports the dowsing rod must hold himself prepared to accept as truth astrology with all its lengthy mazes and mysterious dogmas, witchcraft with its repulsiveness, and spiritualism with its palpable imposture, to ignore the Creator of the universe, and to precipitate himself in a sink of doubt and all the depths of dreadful mystery. N. B.

ANCIENT DISCOVERY OF LODES.

SIR,—Being away a little distance from home I cannot so fully reply to Mr. P. W. Flower as I should wish, or even as that gentleman deserves, but for his information respecting the letter containing dates, which were stated very "plainly and boldly," I may state that the quotation was from a book entitled "The Religion of Ancient Britain Historically Considered," by George Smith, D.D., F.A.S., pp. 15, 16, 17, where, after giving an extract from Pliny, a famous naturalist and distinguished literary man of Rome (and whom we acknowledge wrote 500 years after Herodotus), to the effect that Pliny countenanced the opinion that these articles (tin and lead) were obtained only from Britain and Spain at a very early period. He adds, "We are assured that the expedition of the Phœnician Hercules into the west was undertaken about 300 years before Jason sailed to Col Iris, which was at least a generation before the Trojan war." Lempriere's Classical Dictionary, which is considered an authority, says, "The Trojan war was, according to the Arundelian Marbles, commenced between June 8 and 9, 1184 B.C., or in the 3530th year of the Julian Period, or 408 years before the First Olympiad." Whittaker's History of Greece informs us that Corinth was founded by Sisyphus, the son of Aeolus (1616 B.C.); also that Thebes was founded by Cadmus (1493 B.C.); and a classical dictionary published by Longman and Co. corroborates the above. Ure's Dictionary tells us that the art of casting bronze statues was brought to a state of refinement by Theodorus and Roccus, 700 years B.C. These dates, in connection with pottery, &c., going still further back in the world's history, could be given almost without number; and I suppose that the writers and compilers of ancient history bear an analogy to Mrs. Partington's astronomers, "who guessed a quarter part of the distance and then multiplied by four." What Homer is amongst poets, Pythagoras amongst philosophers, Demosthenes amongst orators, Thucydides and Herodotus are amongst historians.

Mr. Flower, Herodotus did not inform you that Moses and Solomon were contemporaries. Sacred history and "Rollin's Ancient History" both affirm that in 1491 B.C. the Israelites left Egypt; Amenophis was swallowed up in the Red Sea; and that in 1013 B.C. Pharaoh gives his daughter in marriage to Solomon; and not that the Books of Moses were written 1015 B.C. I am sorry that so much space should have been necessary to reply to Mr. Flower, and, if he differs from the remarks now made, shall have no objection to discuss the subject with him through the post, or in a suitable paper, as I think it altogether irrelevant to the pages of the *Mining Journal*.

July 21. EDWARD SKEWES.

WEST CHIVERTON MINING COMPANY.

SIR,—I, for one, was very pleased to see the remarks in the City Article of the Journal of July 10, and also those of "Old Miner," respecting the reports, &c., of this mine, as from personal knowledge I know how beneficial to the general public, if not to some of the most interested parties, such reports issued weekly and regularly would be. The Secretary replied to your remarks in the tone of an "injured innocent," but I am sorry to say I do not think him so—at least, my experience of him differs. For instance, at the end of June he informed me the indications of the lode just cut in the 150 were very favourable—in fact that, although they had cut into it 2½ ft., no north wall had been reached, and it was a better lode than in the level above (the 140), that being worth about 55*l.* per fathom. Now, I would ask Mr. Granville Sharp to explain how it was that these reports which forced up the shares were so sedulously spread? Why the regular Friday report was not brought to the Market, and so fairly shown as usual, and whether it is true that both he and Captain Southey sold several shares (either directly or indirectly) just before the report was published, that sent down the shares 50 per cent.?

Great Winchester-street, July 21. HENRY MANSELL.

WEST CHIVERTON MINE.

SIR,—If you will allow me, I wish to comment upon Mr. G. Sharp's letter of last week, also in reply to suggest to him that a weekly statement in the Journal of any alteration, good or bad, in the mine will do away with the visits of the inspectors sent by brokers or any other persons, because both the necessity for these visits and the private benefit derivable therefrom will cease, and therefore, doubtless, this expensive and troublesome custom, the consequence of uncertainty from either want of confidence or information, will quickly be discontinued, but whilst such great fluctuations occur in the prices of shares as in Stock Exchange lists between Thursday, June 24, and July 2, on or between which dates reports might easily have twice been sent to the Journal, no intimation was then afforded us on either of those Saturdays of anything having taken place to justify these great changes. Remembering also that about June 25 the joint from which so much was expected was cut, this continued silence under these circumstances leads to the suspicion that something not quite open and straightforward has been practised upon us, and upon which there might be some light thrown. could we be informed as to the share transactions of the secretary and other well-informed officials during this period of the general proprietors' ignorance.

I think it but just, and the only sound policy, for full information to be published at the first opportunity after any important discovery, good or bad, and not, as in this case, allow transactions to be recorded—June 24, 15¾*l.*; June 25, 19*l.*; June 26, 20¼*l.*; June 27, 21¼*l.*; June 29, 24½*l.*; June 30, 24½*l.*; July 1, 21¾*l.*; July 2, 18¾*l.* to 14*l.*, &c. And during this time the country proprietors remained in total ignorance as to the cause, and should this take place again I for one shall certainly wash my hands of such one-sided business, although— AN OLD MINER.

MINING INVESTMENT.

SIR,—I am obliged to you for inserting a short time ago a letter from me calling attention to the present condition of mining, and to the fact that there is no lack of good investments, notwithstanding the depression which prevails. With your permission I shall return to the subject, and point out a few facts worthy the consideration of your numerous and influential readers, as my long experience in mining and mining investments enable me to do so. The dulness in mining affairs has now lasted a considerable time, although various symptoms of revival have presented themselves. There has been a progressive business in copper without any marked increase in our imports, or any great finds, such as the Devon Great Consols was, and although the trade in tin and lead has not made progress the market has not been glutted from our own mines, nor from excessive imports. Stocks, therefore, have been declining at home and abroad, which upon the slightest rally in business will have to be supplied either from the vigorous working of the old mines, or the discovery of new deposits, of which some such have recently been made offering additional opportunities for prudent and yet spirited investment.

Another circumstance ought to be noticed which has great influence upon the prosperity of mining adventure and cheap discounts. To-day for three months' bills, although nominally the charge was 2⅜ to 2½ per cent., many negociations took place with the brokers, and at the joint-stock banks so low as 2¼ per cent.; and very great surprise was felt in the City that the directors of the Bank of England did not reduce the official minimum from 3 to 2½ per cent. The strength of the Bank would admit of this; the stock of bullion is about 28,000,000*l.*, the largest ever known since Peel's Bank Act of 1844 was passed. The reserve of notes and coin is 13,000,000*l.* (giving round numbers only), and the proportion of reserve to liabilities, which was last week a trifle under 46½ per cent., is now slightly over 49½ per cent. Thus rich, with the whole discount business passing to the open market, no export in the bullion market, and the continental exchange all favourable to this country, the directors would have lowered their minimum rate but for the disastrous inundations both here and on the Continent threatening destruction to the harvests. Should the season yet be propitious for the harvest, as the weatherwise say it will be, discount will be as low as 2 per cent. in the open market before many days will elapse, and it requires not the gift of a prophet to foretell that this will give a great and universal impulse to mining.

Besides the very long time which bad metal markets have prevailed, judging by all precedents, portends that a season of reaction is approaching. Now, if ever, is a good time to buy. "It is a long lane that has no turn," says the proverb, which pithily expresses the opinion I broach, that bad seasons for business when they have prevailed long are near their termination. The motto of the mining investor should be *nil desperandum*, and his courage and his patience will have a full reward, if he has invested with prudence, under the advice of those competent to give it. Investment has too often been mere reckless speculation, which would have entailed loss or ruin in any other business besides mining. There appear to be many tokens that revival will not only be soon, but more gradual and lasting than on similar occasions heretofore.

In my recent letter to you I mentioned Chapel House Colliery as an excellent investment. It is well to inform capitalists, so many of whom resort to your paper for information, that the shares of the colliery just named realise 15 per cent. returns, and the mine is still progressive. The output is from 6500 to 7000 tons per month, and the whole of the new plant is being laid out with a view of raising 1000 tons per day, which would proportionately increase the dividends. New coal deposits have been discovered within the last few years, but they have had no influence upon prices, which, although still high, have receded with the restriction of trade, especially in the manufacture of iron. Chapel House Colliery is situated in Lancashire, the only county in England where manufactures of every kind are carried on, from pins in Manchester or files in Warrington to iron ships at Liverpool; from the whirring spindle to the locomotive and the steam engine. Lancashire, rich in coal, cannot produce enough for her wants, and if the Chapel House management draw forth 1000 tons a day from the pit it can all be immediately sold.

I will on this occasion content myself with the mention of one other most excellent and eligible investment; it is a lead mine in Cardiganshire—Monydd Gorddu. No mines pay better than lead, even when no silver to notice is produced. You have shown in your leaders that we buy more lead from foreigners than we sell to other foreigners, and we consume all that we purchase, and the residue of our own yield after our slender exports. There is, then, vast scope for this production. Besides, Sir, every fair, average lead mine pays, pays well always, and regularly. You observed in one of your leaders some time ago "Lead is the steadiest of all metals." But the mine in question is exceedingly rich; it is a marvel in Cardiganshire even, marvellous for its yield of lead from the days of the Romans to the success of Sir Hugh Middleton, and from the latter to those of the prosperous Cardiganshire lead miner, the Right. Hon. John Bright, M.P. The late Capt. Matthew Francis, to whom Cardiganshire owes so much as an explorer and practical miner, used to aver with energy that half the lead-bearing ground in Cardiganshire was not opened up, and that if we did justice to ourselves we need never import any lead. Monydd Gorddu has been proclaimed a mine of vast wealth by the very best judges, such as Prof. Readwin, F.G.S., Mr. W. M'Culloch, C.E., Capt. Roach, of the Van Consols Mine; and the leading captains of Cardiganshire. Mr E. Rowse, of 'Aberystwith, bears this remarkable testimony, "It is situated in the heart of the lead-bearing district, and surrounded by mines, in none of which, although they have realised many millions of profit, has there been a discovery made of such an enormous mass of rich ore at surface as there has been laid open in this mine." The capital is 13,000 shares, of 5*l.* each, some of which are now available for purchase by investors, who by acting promptly will make an acquisition of great value, such as no opportunity to realise is likely to occur again.—*Royal Exchange Buildings, City, July* 22. GEORGE BUDGE.

ST. PATRICK MINE.

SIR,—The very encouraging reports from this mine induce a strong belief in the minds of practical men, and those best able to judge, that this little property is on the point of fulfilling the most sanguine expectations of the adventurers, possessing every feature requisite to become a great success. It is attracting considerable attention in the district—Holywell, in Flintshire—and the highest opinions are entertained of the mine by Capt. W. Francis, the able manager. The area of St. Patrick is decidedly very large, and embraces the entire lodes of South Prince Patrick, and the richest of Prince Patrick, besides other known rich pipes of ore, which traverse the sett diagonally. A splendid shaft (the finest in the county without exception) is completed in timbering, and a cross-cut has been discovered driven already 25 yards by the former proprietors. The shaft was also sunk at a great cost by these gentlemen, who, however, failed to prosecute the search for coming riches, one of their number having lately expired, and funds failing at the time; those and other difficulties inducing them to relinquish their prize at the moment of success. It may be here mentioned that two cross-cuts are being driven to intersect the lodes running across the sett, one at 120 yards and another at 80 yards from the surface, the first of these lodes being called Bramwell's. Lead is already discovered in the 120 yard cross-cut, and the cutting of the lode is now considered imminent. The ground in the 80 yard cross-cut is also improving. All heavy costs in this property are done away with, and the monthly costs are but 50*l.*, and great interest is attached to the weekly reports issued. Prince Patrick stands at a figure of 3*l.* 10s. per share, thus making a price in the market (with its 18,000 shares) of about 60,000*l.* and upwards. North Prince Patrick, with its 20,000 shares at about par, stands for 20,000*l.* South Patrick, with but 6500 shares, counts but for 6500*l.* if called at par. South Prince Patrick, again, stands at a good figure, with its 8000 shares issued. Risk in St. Patrick Mine may be stated to be absolutely nothing. The ground in the cross-cuts is most congenial for coming lead, being composed of various mixtures of excellent mineral gossans. The shares must stand at a large premium on cutting Brammel's lode. There are nearly 2000 shares yet to be disposed of, and in reserve, if ever wanted, just 2500 more. Some prominent and unusually wonderfully favourable features in this mine must be mentioned.—1. There are no expenses whatever for draining the mine, the same being accomplished by fissures in the rocks, causing a natural drainage. There is no expense in dressing the ore, the same being simply broken off by a hammer from the rock, at a cost of about 10s. or 12s. per ton. There is no cost for sinking a shaft (about 2000*l.* and loss of two years' time). The property is held direct from the Duke of Westminster's agent, who entertains a very high opinion of it. These advantages already mentioned must give some idea of the profits and future dividends on so small a capital as that of St. Patrick—6500*l.*, and may tend to give some estimate of what the price of these shares must be in a few weeks' time, or, at least, we may reckon on a certainty that the time for developing this property cannot be but a couple of months, most probably within a very few days, important news being hourly expected. LEAD MINER.

London, July 21.

WEST MARIA AND FORTESCUE CONSOLS.

SIR,—In the Scottish Mining Report a short while ago Mr. J. Grant Maclean called attention to the neglect of West Maria and Fortescue shares, which are about 5s. for shares upon which 4*l.* 10s. has been paid, and his remarks seem well worthy of consideration by the public if one could only obtain some information as to the position and prospects of the company, which seems to have been in existence a great many years, and to be selling quantities of copper ores and arsenic regularly, as may be seen by your valuable Journal. As secretaries of companies very properly decline to furnish information to non-shareholders, perhaps some of your readers would be good enough to give some information as to the real value of this "neglected security." I write in the belief that although you give notice that you do not recommend any particular mine for investment, &c., you may not object to some of your subscribers throwing light upon a subject which must be of general interest to the investing public, as the best things in mining are generally ignored by the English public until it is too late to buy with advantage, in consequence of not being "in the know." I hope you will give this publicity in the interest of your general readers.—*July* 20. HARTZ.

THE WORLD'S SUPPLY OF COPPER.

SIR,—The copper mines of Cornwall were once the principal source of supply of the world. Now Australia, Cuba, and North and South America contribute largely to that supply, but still the demand increases, so that there is no fear of any serious decline of price. But the United States intends henceforward to supply herself, and those who desire to participate in the future profits of the copper trade in that country will have to do so by undertaking to assist in the development of the copper mines and the manufacture of copper from American ores. Prior to the discovery of the fine beds of ore of the Lake Superior region the United States was not supposed to be peculiarly blest in the possession of this useful metal. But the development of the rich and abundant veins of copper ore that has steadily progressed in that section made them almost independent of the world. Still later there was the discovery of copper in North Carolina, and very recently a development of an exceedingly large and rich deposit of ores in that State, which promises to become of great importance to Baltimore. But little more than two years ago some several of the wealthiest and best-known citizens of Baltimore became the owners of a track of land in Ashe county, North Carolina, lying round about an uncultivated mountain, known as Ore Knob, a name that seems destined at no distant day to take rank with Cornwall and the Lake Superior regions as one of the world's sources of copper supply. A company was at once formed, and set to work with great energy. A number of exploration shafts had been previously sunk, discovering a vein of ore ranging from 14 to 18 ft. in width, for 1¼ mile within the company's bounds, and ranging in richness from 6 to 30 per cent. Some idea of the value of the deposit may be gathered from the fact that ores testing 3 or 4 per cent. are worked profitably in this country, and a copper schist is wrought to pay at Mansfeldt, in Germany, which yields but 1 per cent. of copper. With this before them the company proceeding to sink principal and engine-shafts, and to erect extensive works for the reduction of the ores by the Hunt and Douglas process, the practical value of which has been proved elsewhere.

The Hunt and Douglas process is considered to be more interesting and more economic than the ordinary process. At Ore Knob the ore is crushed and passed through revolving sieves of 40 holes to the lineal inch; what fails to go through is returned automatically for re-crushing and sifting, and in the meanwhile the sifted product of the crusher is charged into cars and carried to the calcining furnaces; here it is desulphurised, the process at once rendering the copper in the ore soluble. From the furnaces it is carried to the tank-house, where there are over 100 tanks, each 12 ft. in diameter and 5½ ft. high; in these tanks a bath, the chemical constitution of which forms part of the basis of the Hunt and Douglas patent, takes the copper up in solution, and leaves the useless residium to be subsequently removed. This copper liquor is then passed off into tanks, where the presence of scrap-iron brings about precipitation in a few hours. The result, known as copper cement, is removed, and a perpetually moving wooden pump run by steam repumps the liquor back into the stock reservoir, to be again distributed and used. A curious fact in this connection is that a wooden pump is used, because an iron one would be dissolved by the liquor.

The company's progress has been steady and cautious, but withal rapid. After marketing a considerable amount of cement copper, the management reached the conclusion that it had as well earn the refiner's as the miner's profit, and steps were taken at once in that direction. In May of this year a refinery and blast-furnaces were completed, and Ore Knob was turning its product into ingot copper, a 2 ton sample of which, sent to the Revere Copper Company, of Boston, brought a return of 23¼ cents per lb., the very top of the market, and a handsome testimonial of the experts of that company as to the purity of the metal. This refining furnace has a capacity of 8 tons per diem. Besides it, the plant embraces five steam-engines, a half-dozen calcining furnaces (with bricks enough now making to erect a dozen more), two cupola blast furnaces, two reverberatory furnaces, the extensive series of tanks, roasting-furnaces, pumps, machinery, &c., of the Hunt and Douglas process, &c. All of which it is the policy of the management to increase largely and continuously.

It is no longer problematical, then, but an assured fact, that a Batimore company owns a mine that gives it, at least, an entrance upon an even or superior

footing with all rivals to the copper markets of the world. It may not be asserted, however, that all the energies of Ore Knob are exhausted in earning dividends for stockholders in Baltimore; for it is doing wonderful things for the corner of the State in which it is located, and its usefulness and wealth scattering power must grow and enhance as the years go on. A little more than two years ago Ore Knob was the synonym for a wilderness, whose wide trackless wastes it was difficult to tread, even upon horseback. Now it stands for a growing, thriving town, incorporated by the State, with its own mayor and aldermen, an embryonic manufacturing and mining metropolis. Within these two years the company itself has erected nearly 100 buildings, including dwellings, storehouses, &c.; and it runs a store, for the supply of miners and the country folk round, which sells about $40,000 worth of goods per annum.

To give some idea of the company's importance and usefulness, and its consequent influence, it may be stated that at the last session of the Legislature an Act proposed on its behalf, making it a penal offence to sell liquor within three miles of the corporation limits of Ore Knob, was passed through all its processes under a suspension of the rules, and made a law of in one day. Much of the local success and prosperity of the company's affairs is due to the untiring energy and indomitable zeal and enterprise of Mr. James E. Clayton, its agent resident at the mines. He has superintended the erection of its buildings and machinery, organised its forces, and so trained and drilled the native labourer as to lift the company at once beyond the power of foreign skilled labour in mining, smelting, or refining. He has been and remains simply invaluable. A MINER.

Boston, U.S., July 5.

[For remainder of Original Correspondence, see to-day's Journal.]

Meetings of Public Companies.

BLUE TENT CONSOLIDATED HYDRAULIC GOLD MINES OF CALIFORNIA.

An extraordinary general meeting of shareholders was held at the offices of the company, Austinfriars, on Monday, Mr. J. I. COURTENAY in the chair, for the purpose of considering, and, if deemed desirable, passing, the following resolution, or some amended form thereof:—

"That the directors do, and they are hereby empowered to, borrow at interest, for the purposes of the company, such sum or sums of money, not exceeding in the whole the sum of 15,000*l.*, as they may think proper, and that the directors may, for the purpose of raising such sum of 15,000*l.* or any part thereof, issue debenture bonds in the name and on behalf of the company, on such terms, and carrying such rate of interest, and for such amounts as they may think proper, or that they may on behalf and in the name of the company give for or in respect of the said sum of 15,000*l.*, or any part thereof, such other security as they may think proper."

Mr. W. J. LAVINGTON (the secretary) read the notice convening the meeting.

The CHAIRMAN said: This meeting has been called in consequence of the advice of Prof. Price, of San Francisco, recently appointed the general agent of the company in California, that a further sum of money beyond what we have in hand should be raised to defray the cost of our aqueduct and to make certain improvements on the property. This aqueduct comprises the wooden canal or flume, the tunnel section, and the portion that has to be dug through earth. Of the flume there remains 1¼ mile to be completed, and it is here mainly that the divergence between the estimate of the late superintendent and that of Prof. Price occurs. This portion has to be built round a rocky point (locally known as Cape Horn), and Mr. Price thinks it will prove to be more costly than any of the previous fluming has been, and that lumber above what is already in store will have to be provided. Some repairs will be needed on the flume, a portion of which was erected two years ago. The long tunnel through rock, which took more than a year to bore, is finished. Mr. Price thinks that several miles of the lower end of the canal should be constructed of larger capacity than we had at first thought of making it, and I fully agree with his recommendation. Work was commenced on May 29, and by June 27 over three miles had been finished, and it is very satisfactory to know that it was built within the estimate which had been furnished, and as a larger force of men —some 450 or 500—are now at work still more rapid progress will be made—probably more than a mile per week. We must finish the work in the mountains by Nov. 1, to avoid being caught by the winter storms, and it is most desirable to have the earth portion of the canal finished as early as possible, so as to avail ourselves of the first rains for puddling it. Mr. Price also recommends that we should open up upon the Gopher claim without delay—another valuable section of our property—the object being to provide a new outlet for the top dirt from the bank overhanging the South Yuba Pit, so that we may run off rapidly the top dirt through the Gopher ravine, while the bottom dirt will pass off by the South Yuba Tunnel. To finish and put the aqueduct in good repair and make the improvements I have mentioned will cost 9000*l.* or 10,000*l.*, and it is proposed to provide this amount by the issue of debentures. These debentures will bear interest at the rate of 12 per cent. per annum, and will be repayable at the end of five years. We have taken power in the resolution I shall propose to borrow 15,000*l.*, but we do not require all that sum immediately—a less amount would suffice for the present. The canal finished the company will have water in abundance free of charge. How profitable and how important to the interests of the company the completion of this work will be is manifest when I state that in our last run, in the month of May, only working a portion of one of our claims we took out in 21 days gold to the value of $9750. Labour and other expenses amounted to $4850, while we had to pay for water $3600, and that for a supply of water wholly inadequate to our requirements, so that the profit was only $1300. If the aqueduct were finished the profit would have been (using the same amount of water) nearly 1000*l.*, but we shall have at our disposal double or treble the amount of water we now buy, therefore a proportionately larger profit should be earned. Our flume is constructed to carry 4500 in. of water; the bulk of this we intend to use at our own mine, and the rest we shall, I have little doubt, be able to sell, as the miners on the line of our canal told me when I visited it last autumn that they were very anxious to buy; they are not able to purchase any water now; it there would sell from 12 to 15 c. per inch for 24 hours' supply. As you are aware, there has been a short supply of water in California for mining purposes this season owing to the small quantity of snow in the mountains, and all hydraulic mines have suffered in consequence, but even while there was plenty of water in the river we were only able to buy a very scanty supply. Had our ditch been finished last year the results would have been satisfactory in spite of the exceptional season. The security for the debentures is most ample. Including the previous issue, there will be 25,000*l.* in all, to secure which you will have a splendid aqueduct of 27 miles length, by which a larger stream of water will be at our disposal than is, I believe, possessed by any English company, and the mines themselves, in addition, comprising some 500 acres of auriferous gravel, both together constituting a property of great intrinsic value. The making of this property pay, and pay handsomely, is merely a question of water, for—and I am fortified in this statement by the opinion of those who are very skilled in hydraulic mining—with the aqueduct finished and the mines well opened the property owned by this company will be second to none in California. I ask the shareholders, therefore, with confidence to take up the debentures.

Mr. DICKSON said that, having accompanied the Chairman during his visit to the property, he could bear testimony to the fact that the miners in the district expressed their desire to use the water of this company as soon as ever the ditch had been completed.

Mr. FOOT said the notice of this meeting had taken him by surprise, as he had been given to understand the sum of 10,000*l.* or 12,000*l.* debentures already raised would have been amply sufficient to complete the ditch. There could be no doubt as to the expediency or actual necessity of completing the ditch, the question was as to economy in its construction.

The CHAIRMAN said the necessity for raising this additional money had arisen from the fact that the estimate made by the late manager for completing the most important portion of the flume had been considered to be tolerably correct, accordingly a sum was raised sufficient to complete it. As soon as the ground had been opened he requested Prof. Price, with whom he travelled last year in California, to give his opinion whether the estimates were adequate. Prof. Price took a practical ditch builder with him, upon which he wrote to the board that the estimates for the completion of the flume were insufficient, the ground being exceedingly rocky, and very difficult to estimate; besides which the lumber in stock was also insufficient.

Mr. FOOT asked the amount required to finish the ditch?—The CHAIRMAN said about 6000*l.*, and 2000*l.* to 3000*l.* for the flume and fitting up the Gophir Ravine claim, and repairing the flume and increasing the lower part of it, making it much larger than originally contemplated, having extended the scale of operations very considerably. Prof. Price had been connected with hydraulic mining for many years, and had already completed three miles of the ditch for less than his estimate.

Mr. GEO. BATTERS said there could be no question about the trustworthiness of Prof. Price, who had taken the helm of their affairs. Prof. Price stood in an undoubted position, and, judging by his past career, was a man of unquestionable honesty, experienced judgment, and sterling integrity. Although it would take a larger amount to complete the ditch than originally computed, the value of the claims had been proved beyond question; the company possessed a *bona fide* property of great and attested value,—of greater value indeed than they had ever been led to suppose it to be.

The CHAIRMAN, in reply to a question, stated that he had not given an estimate of the profits likely to be realised when the ditch should have been completed, because they would have a full report from Prof. Price by-and-by. Judging, however, from past results, seeing that in the very last run of only 21 days the net profit realised with free water would have been no less than 1000*l.*, it might safely be concluded that with a double supply of water, costing them nothing, the profits must be proportionately larger. In addition to this, within the next two months they would be able to make contracts on the line of the canal to sell the surplus water to a considerable amount, yielding a very substantial revenue.

Mr. LASCELLES (a director) said that 27 miles of the ditch had to be finished, and through a very difficult country, so that it was very difficult to ascertain until the ground had been surveyed what the expenditure would be.

The CHAIRMAN said if they could finish the flume for carrying 4500 in. of water —3000 being taken on to their mine—for 30,000*l.*, it would be, he believed, one of the cheapest aqueducts ever made. It must be finished by November, and Prof. Price would no doubt endeavour to get it finished sooner.

Mr. G. BATTERS spoke as one of the largest shareholders in the company, and it was of immense importance to him that this work should be completed in that given time, and the money must be found. When completed this property would be one of the most profitable enterprises in all California, and the most improving one devoid of speculation.

The CHAIRMAN said the work would be finished this year, as they had already had an offer for a substantial portion of the debentures, and if the shareholders did not take them up other people would who knew the value of the property, getting a higher rate of interest than from any other source, and with better security.

Mr. FOOT asked whether any provision was to be made for a sinking fund?

The CHAIRMAN said when their profits were so large that the shareholders did not want such large dividends they might think about setting aside a portion of the profits towards a sinking fund.

The resolution was then put, and carried unanimously.

The CHAIRMAN said the meeting could not be allowed to separate without expressing his satisfaction at having such a man as Prof. Price at the head of the company's affairs in California. He felt that the interest of the company would be thoroughly protected by that gentleman, and that he would not have accepted the management of this property, or taken the trouble he had taken, did he not feel perfectly satisfied that a substantial success would be realised.

Mr. BATTERS said too much praise could not be bestowed upon their worthy Chairman, who had devoted so much of his time and attention in the promotion of the company's interests, and they had also a board that merited the implicit confidence of every shareholder, who might rest perfectly satisfied that the day was not far distant when satisfactory dividends would commence to be paid. He had much pleasure in proposing that the best thanks of the shareholders be accorded to the Chairman and directors.

The resolution, having been duly seconded, was put and carried unanimously.

The CHAIRMAN, having appropriately acknowledged the vote, stated that it was true he had given great attention to the company, because he had great confidence in the property, and he hoped that at the next meeting he would be able to announce that the work had been successfully accomplished.

The meeting then terminated.

NERBUDDA COAL AND IRON COMPANY.

An extraordinary general meeting of shareholders was held at the London Tavern, on Tuesday, for the purpose of authorising the directors to affix the seal of the company to a deed proposed to be made between the Secretary of State for India in Council of the one part, and the company on the other part, whereby the company will be relieved from their contract obligation to manufacture iron; and also for the purpose of authorising the directors to declare an interim dividend out of the profits of the current year,

Mr. WILDE in the chair.

Mr. BLUETT (secretary) read the notice convening the meeting.

The CHAIRMAN said that the shareholders had been called together for two objects, as indicated in the notice, but he thought it would be the more convenient course to take them separately. With regard to the new contract, it had occasioned a great deal of trouble. Six years had elapsed since they first applied to the Government to be relieved from the covenants in their agreements imposing upon them the manufacture of iron. When the company was originally started it was thought that the manufacture of iron would pay very well—in fact, almost as well as coal mining. At any rate, they were bound to take it; but it was subsequently proved that it would not pay to make iron in India, especially for this company, after having expended so much money owing to the delay in the completion of the Great Indian Peninsular Railway, the expenditure having increased from 25,000*l.* to 100,000*l.* Under these circumstances, they applied to be relieved from making iron; from that time up till now—a period of six years—after almost endless negociations and interviews, they were enabled to come before the shareholders with certain terms subject to their approval.

The terms on which the company are relieved from their contract obligation to manufacture iron may be shortly stated as follows:—

1. The company give up altogether the tract of land north of the Nerbudda River, which contains iron ore, but is not supposed to contain coal.
2. The company yields the right to the Government to permit persons to raise coal for smelting or manufacturing iron, &c., but not for sale on any part of the land south of the River Nerbudda, except within one mile of any part from which coal is then being raised by the company, or *bona fide* used by them for ventilation, or pumping, or in course of being sunk for *bona fide* use.
3. Should seams of coal of sufficient quantity and quality to be worked to a profit be discovered in the tract of land south of the River Nerbudda, and between that river and the Great Indian Peninsular Railway, and the company should not within two years after receipt of a formal notice in writing by the Government of India requiring them so to do, commence and continue to get coal, then the Government may authorise other persons within that tract to raise coal for sale, but the company is to receive a royalty of 1-20th of all coal sold.

Mr. BLYTH (the solicitor) read the terms of agreement.

The CHAIRMAN then proposed that the directors be authorised to affix the seal of the company to the proposed deed between the Secretary of Council in India and this company.——Mr. MANNING seconded the proposition.

A SHAREHOLDER enquired whether this deed interfered with their right to work for copper?——The CHAIRMAN replied that it referred exclusively to iron, and did not in any way interfere with their rights to copper.

A SHAREHOLDER asked what royalty the company paid the Government for the coal raised?——The CHAIRMAN: About 6d. per ton in round numbers, and the company would receive as royalty 5 tons for every 100 tons raised within one mile from the company's pits.——The resolution was then put, and carried unanimously.

The CHAIRMAN said the next question was that with reference to the declaration of an interim dividend. The board would not have convened the shareholders at so early a period as the present for this purpose alone, but inasmuch as it was necessary to have a meeting they thought it better to take advantage of the occasion to recommend the dividend. The reason for asking their authority now was because they found that while there were delivered to the Great Indian Peninsula Railway for the first six months of 1874 7632 tons, there had been delivered up to June 24 of the present year 9594 tons, being an excess of 1962 tons. As to the expenditure, as yet the accounts had been received up to April only, from which it appeared the costs would be about the same, the only difference being the extra cost for raising the additional quantity—that is, 9594 tons, against 7632 tons during the respective half years. There had been expended so much upon what might be called capital expenditure, but there seemed reason to believe the accounts would work out well, and no doubt show a small total beyond the amount at the end of the first half of 1874. Therefore, the board felt fully justified in recommending the same dividend—5 per cent. for the year, or 2½ for the half-year. The first half-year was generally rather more profitable than the last six months, because in consequence of the monsoon the expenses were then a little heavier in proportion. The board would not have considered itself justified in recommending the declaration of this interim dividend unless they thought they saw the way pretty clearly to pay 7 to 7½ per cent. for the whole year—that was what they believed they would be able to do. A great deal was due to their manager, Mr. Maynard, for the successful way in which he had conducted the operations at the collieries, as indicated by the progressive increase in the output—for instance, in the first six months of 1872 the output had been 3293 tons; in 1873, 4715 tons; in 1874, 7632 tons; and this half-year it had increased to 9594 tons, showing a substantial increase. A great deal was due to Mr. Maynard for this satisfactory expansion of their operations, and no less for the reduction in the expenditure he had brought about since he had been manager. He then proposed that the directors be authorised to pay an interim dividend at the rate of 5 per cent. per annum out of the current profits of the half-year ending June, 1875.

Mr. CORBETT seconded the proposition.

The CHAIRMAN, in reply to a question, stated that the board hoped to be able to pay the dividend in about six weeks hence, there being sufficient money at home and in India in hand. The manager was not anxious to remit too readily, hoping to take advantage of the exchange.

A SHAREHOLDER asked if the board had further information about the copper?

The CHAIRMAN said 17 tons were *in transitu* to this country for the purpose of being smelted. They did not know much more about the quality of the ore, except that the prospects were considered very encouraging. The fact was the company had not yet expended much upon it. Should there prove to be sufficient to go into it as a matter of business there was no reason why it should not be worked throughout the year. Labour was gradually increased, but more work could be done if labour was still more abundant. That was one reason why the second half of the year was not so good as the first, labourers leaving for their harvest and returning when it had been completed.

The motion declaring the dividend was put and carried unanimously.

The CHAIRMAN, in reply to a question, stated that at their spring meeting it would be proposed to make it special, for the purpose of consolidating and reducing the share capital. He was inclined to think it should be consolidated into five shares with 1*l.* 8*s.* paid, should be consolidated into one share of 3*l.*, with 2*l.* paid.

A SHAREHOLDER suggested that the shares should be 5*l.*, with 4*l.* paid.

The CHAIRMAN said a liberal margin of uncalled capital should be left, as another coal field might be found. Having ample uncalled capital had been the salvation of this company.

A SHAREHOLDER could not see the advantage of discovering another coal field if there were no labour to work it.

The CHAIRMAN said that would gradually increase in proportion with the demand; it was increasing every year.

A SHAREHOLDER asked what progress had been made with the coal-cutting machinery?——The CHAIRMAN said that nothing new had transpired. His colleague, Mr. Foster, who was a colliery proprietor, had his attention constantly directed to the subject, which was of such general importance.

Mr. OVINGTON had much pleasure in proposing a vote of thanks to the Chairman and directors, and hoped that they had before them a long career of prosperity.

Mr. BLYTH (the company's solicitor) said as an old and a very large shareholder he had great pleasure in seconding the proposition. As to their worthy Chairman, it was quite impossible for any man to devote greater care or attention to the shareholders' interests. (Hear, hear.)

The proposition was put and carried unanimously.

The CHAIRMAN appropriately acknowledged the vote.——The meeting then separated.

BIRDSEYE CREEK GOLD MINING COMPANY.

The annual general meeting of shareholders was held at the offices, Austinfriars, on Thursday,—Mr. J. T. P. PECHEY in the chair.

Mr. W. J. LAVINGTON (the secretary) read the notice convening the meeting.

The report of the directors (which appeared in last week's Journal) was taken as read.

The CHAIRMAN confessed to some feelings of regret, which he had no doubt was shared in by everyone interested in the company, that the operations of the past year had not been more satisfactory, but he must ask them to remember that the causes which had prevented the non-realisation of better results could not have been foreseen nor averted. The whole was simply due to one pivot upon which all their operations revolved—the water supply. Referring to the accounts, he might mention that the amount owing in California on April 30 was 1052*l.*, but that had since been reduced to 473*l.* It would be readily understood by those who had watched the result of the operations how this balance had arisen, especially when it was known that for the last three months no working had been carried on except some necessary improvements which must attend all mines in operation, and also when it was further known that the new tunnel had cost 2000*l.* or 3000*l.* more than provided for by the debentures issued. Their superintendent, Mr. Powers, entertained no doubt whatever that before the end of the present water season the whole of that debit balance would be cleared off, and that they would start perfectly clear at the commencement of the next water season. The directors, in their report, had informed the shareholders that they had taken advantage of the visit to California of one of their colleagues, Mr. Bowe, to request him to prepare, in conjunction with Mr. Powers, their valued superintendent, a detailed report on the present position and future prospects of the company's property. That report had arrived, and he was very glad it was entirely satisfactory, and that at no time had the claims looked so well, and the ground opened up been in such large quantities as the present moment. Mr. Bowe says:

"Mr. Powers will, and has thus far, only made the most necessary improvements, and whatever he suggests you may rest assured is absolutely necessary to keep the property running. It is not necessary to admonish him as to the question of economy. He thoroughly understands our situation and wishes in that regard, and all his work exhibits the strictest compliance with your wishes. You can be assured that not a dollar will be expended that can with any reason be avoided.

As to the details of the report you ask, I shall leave to Mr. Powers, but I may mention that I think the property looks to be in better shape than ever for successful work.

The Neece and West bank can only now be said to be really through the drifted and into the solid ground. The bank on the channel face is about 200 ft. high, and in good shape for working, and I confidently predict much better returns in the future from this claim. We have about 400 ft. more in the channel of Neece and West the depth above mentioned, and there is about 10 acres of the Brown's Hill claim from which the top has been washed off, leaving a bottom bench of about 50 ft. Through this there appears to be a side channel, all of which, however, can be washed off through our Neece and West tunnel. This, in conjunction with about 12 acres of side dirt on the south side of the Neece and West ground, will be washed off in connection with the channel portion, from all of which I think we may safely expect good returns for the next four or five years.

The Red Dog property, which is now pierced with the Pechey tunnel, gives us a very extensive run on the channel. We have there about 3000 feet of channel, 1500 or 2000 ft. of which is independent of the Star of the West ground. This will give us work on the bed-rock many years as soon as we get the pit opened. Mr. Powers thinks he will accomplish this within three months from the commencement of water season, and I am in hopes he will make more than expenses in this preliminary work. When he is once on the bed-rock, with a good face, we may confidently look for good returns from this portion of the company's property for many years. The tunnel is run and the shaft raised near the longitudinal centre of the channel, and I think the whole of this portion of the property can be washed off through this opening. This pay channel must be at least 800 to 1000 ft. wide, and all of the drifting that has been done by former owners is in a strip 80 to 100 ft through its centre, and it cannot be possible, seeing that the surface for the whole width above mentioned has proved rich wherever washed. There must be much good pay left on the rock for a much greater width than the small strip heretofore drifted.

Mr. Powers is now buying about 400 in. of water from the South Yuba, and hopes to be able to run till August 1, and I am satisfied our present arrangement with South Yuba for water cannot be better by any contract we could make."

The report of Mr. Powers was then read, as follows:—

You Bet, California, June 21.—At the time of your last annual meeting for the fiscal year ending April 30, 1874, we had every reason to expect that the past season would be more profitable than it has proven. Circumstances entirely beyond our control has caused it to fall far short of our reasonable expectations. The rains commenced early, and gave promise of a long and prosperous water season. We had our first rainfall about Nov. 1, and Nov. 6 we commenced washing in Neece and West claims, since which time we have utilised nearly our entire water supply for the past season upon these claims. When we commenced washing through Neece and West new tunnel it was represented that we had only about 200 ft. of broken or drifted ground to wash up until we would be in solid bank. The result has been that we have already washed nearly 400 ft. in length of channel, and are now only partly through the drifted ground.

We have to-day exploded a blast of 350 kegs in solid bank on what appears to be the pay channel; and permit me here to remark that the gravel is improving in appearance as the washing progresses, and I think we may confidently expect better results from this claim from this time forward. We have yet left on this channel nearly 400 ft. in length by 400 ft. in width, with about 10 acres of side wash on the east side of the channel, all of an average depth of 200 ft., also nearly the entire lower strata of the Brown Hills claim of an average depth of 50 ft., containing about 10 acres of ground more or less, all of which can be advantageously washed through Neece and West Tunnel by running one short branch tunnel of not more than 250 ft. in length, which can be run at intervals whilst the ground is being washed from the main channel without adding very materially to the running expenses of the claim.

I am now running Neece and West Tunnel ahead at a cost of about $16 per lineal foot, and charging the same to the running expenses of the claim. It will not be necessary to extend this tunnel more than about 40 ft. further, which will carry it 200 ft. beyond the present shaft, and will be quite sufficient to work out the company's ground. We have abandoned the reservoir situated on the bank of these claims, and have just completed a flume conveying the water around on the east side of this reservoir entirely off from this company's ground, which will give us an opportunity of washing the entire claim without much further change of pipe or flume.

Birdseye Canyon: The outlet to this property, owned by Mr. C. H. Hawkins, is being worked quite satisfactorily for the present, and I feel in hopes that we may have no further trouble from this source.

Waloupa claim contains about two years of available surface washing through the present outlet, which will pay current rates for water and other running expenses. I have thought it would be advisable in the course of next year to take up the grade now used in dumps in sluices, whereby we could get into the bottom ground nearly 30 ft. lower than the present sluice, which will give us from two to three years profitable washing to rock, besides serve as a guide for running a tunnel to bottom the entire channel.

There appears to be a deep channel running through this set of claims from north to south for a distance of about 2000 ft., the depth of which is not known. The front channel has been worked out, and was said to have been exceedingly rich. The cost of taking up the grade of the present tunnel and constructing flume will not, probably, exceed $2000. The bottom can then be worked in conjunction with the top strata with, I think, reasonable profits for two or three years to come, or until there can be a tunnel run low enough to tap the entire channel. This set of claims is situated on the west side of Birdseye Canyon, and is entitled to an outlet through the same.

Uncle Sam and Mallory: This group of claims, which will include the Duryea purchase, has no further available surface that can be washed to any profit through the grade of present sluices. The outlet to these claims is through Wilcox ravine. In order to make a success of this property there will require to be a tunnel run from Wilcox ravine of nearly 1500 ft. in length. This property is thought to be the most valuable of any of the company's claims for hydraulic mining, but as we shall not require this for several years to come, I would suggest that the company defer the running of this tunnel until such time as they can procure a cast-off Burleigh drill from some other company, when they may have no further use for them. We can then, by the aid of this drill, run this tunnel in a few months time, and comparatively much cheaper than at the present time. There is 1500 ft. in length on this channel, and as much more on the north next to Missouri canyon that is doubtful. The first 1500 ft. next to the Brown Bess claim is sure to cover the main channel, and is quite 1000 ft. in width by 150 ft. in depth. This property is also entitled to outlet through Wilcox ravine.

Red Dog Claims: This group of claims, including the Sterh purchase, contains about 1500 ft. in length of the blue lead channel, by 900 ft. in width, independent of the Star of the West and Mallory claims. The Birdseye Company owning 6 10ths of the former, and one-half of the latter.

The Pechey tunnel was started March 30, 1874, and finished March 31, 1875, length of tunnel, 775 ft.; size, 7 ft. by 8 ft.; depth of shaft in gravel, 70 ft.: in rock, 90 ft.: total, 160 ft. The shaft has been lined, and blocked sluices constructed in the tunnel, and blocked ready for washing through, at a cost of $21,416 65. It is not to be expected that large profits will be realised from the first whilst opening out the shaft to the rock and getting a suitable face to enable us to work our complement of men with some degree of safety. This claim has been only partially drifted, is reported very rich, and will, no doubt, augment our receipts ma-

terially next season, provided we are successful in opening the shaft in good time, as we now feel confident of doing.

Ditch expense: We have within the past year re-built high flume across Wilcox ravine on main ditch, and enlarged the Waloupa branch leading from the town of You Bet to Waloupa reservoir to the size of main ditch: also we have removed the main supply-pipe conveying water from the town of You Bet into upper reservoir, and constructed a suitable flume in its stead, at a total cost of $559·34. We have also within the past year constructed 489 rods of new ditch, taking the water from Waloupa reservoir back on to Neece and West claim, at a cost of $962·75. Besides the foregoing, there were innumerable small pieces of work, such as constructing flumes, building tanks, &c., &c., the cost of which has been charged up as ordinary expenses under their respective headings as per cost sheet.

Present condition of the various claims: The Neece and West is in good working order, and at present washing. We now expect to buy water from the South Yuba to keep this claim running all of daytime, at least until about August 1. The Pechey claim is also ready to commence washing at a day's notice. The Waloupa is also ready to commence washing at a moment's notice. The surface in this claim looks better than any we have had in sight since first opening this claim, and will give satisfactory returns, I have no doubt, for one or two years to come.

Prospective Profits: By recapitulating the claims which will be washing next season—viz., Neece and West, Pechey, and Waloupa, it is reasonable to suppose that, omitting permanent improvements, the profits will be much greater than any season heretofore since the forming of the company, provided we have an average water season. I have always maintained that the company have a valuable property, only requiring development, and when properly improved it will in a short time reimburse the company for the entire amount of their investment with interest, and still have a lasting and valuable property left. The foregoing is a plain, simple statement of facts, to the best of my knowledge and belief.—G.S. POWERS, Manager.

Having visited and examined the Birdseye Company's property about the 13th of this month, I can cheerfully endorse the above report as being a fair statement of the extent, condition, and apparent prospects of the same.—J. E. BOWE.

The CHAIRMAN stated that the amount of channel literally untouched on the Blue lead was no less than 5500 ft. The more he saw of the property the more he was convinced the time would come when it would amply repay every shareholder for their patience and trouble. As he had already said, their drawback had been the exceptional scarcity of water during the late season. It might be convenient to mention the difference that the scarcity of water had made as compared with previous seasons. Last season the Waloupa claim was worked for six months, and yielded $7045, but this season they had only been able to work it six weeks, during which it returned $1740, the difference being $5305; the Sheba claim was worked last season four months, and gave $5675, but this season it only worked one month, and gave $1235, or a difference of $4440; the Riggs claim last season was worked seven months, and gave $12,859, but this season it had not been worked at all; and the same with the Uncle Sam claim, which last season gave $7810, or an aggregate difference as compared with the two seasons of $30,414. In the whole history of California there never been such a poor water season. The report from Mr. Powers, just read, could not fail to be entirely satisfactory to all the company, and they would probably re-start in December; and upon the Neece and West and the Stehr claims they had before them work without requiring any tunnelling; so that with the coming season, being only a moderate one as regards the supply of water, could not fail to yield satisfactory results. He then moved that the report and balance-sheet be received and adopted.

Mr. GEORGE BATTERS seconded the proposition. He said that having such an exhaustive report from their superintendent, Mr. Powers, supplemented by that from their colleague, Mr. Bowe, left few explanations to be given. The faithful services rendered by their superintendent, Mr. Powers, watched over by their very excellent Chairman, who so thoroughly and practically understood the work in hand (who had given them upon this occasion such a clear and lucid statement as to the position of their property), left nothing to be desired as far as the management was concerned. As to the future, there could be no possible doubt they possessed a property that would prove to be permanently and highly profitable.

Mr. STEELE asked if there was any certainty about the blue lead being in the company's claim?——The CHAIRMAN said that the blue lead had been worked beyond them and behind them, and they had a large extent of untouched ground in their claims; therefore, there could be no reasonable doubt that they had the blue lead.

Mr. STEELE thought it highly satisfactory to find that they had been able to pay out of revenue so large an amount on account of permanent improvement during a short water season.

The CHAIRMAN said that had the water supply been as large as usual there would have been at least 4000*l*. profit more, irrespective of the Neece and West claims. His confidence in the dividend-yielding capacities of the property had not wavered in the smallest degree. He found that the North Bloomfield Company had been running a tunnel for many years, and had cost 100,000*l*., showing that the expenditure made by this company in completing a similar work had been very small, and the time comparatively short. The South Yuba had been constructing a large reservoir, and there was no doubt that in the future they would be able to get a much larger water supply, and, probably, throughout the whole year.

The motion adopting the report and balance-sheet was put and carried unanimously.

Mr. WARD said that they all knew Mr. Batters so well that he need not flatter him in his presence, therefore he would content himself by merely moving that Mr. Batters be re-elected a director.——Mr. STEELE seconded the proposition, which was put and carried unanimously.

Mr. PERRING proposed that Mr. F. Bennett and Mr. C. O. Rogers be re-elected auditors, and that the sum of 20 guineas be paid them for their services during the past year.

Mr. PERRING had much pleasure in proposing that the best thanks of the shareholders be given to the Chairman for the satisfactory manner in which he governed the company's affairs, and for his presiding upon this occasion.——Mr. HODGKINSON had much pleasure in seconding the proposition, which was put and carried

Mr. STEELE seconded the proposition, thanking the Chairman for the very able and lucid statement he had given them of the affairs of the mine. Although disappointed with results of the past year the prospects were exceedingly encouraging as to the future. He had the greatest confidence in the Chairman from the efficient way in which he had discharged his responsible duties during the last few years.

The resolution was put and carried unanimously.

The CHAIRMAN thanked the shareholders for this renewed vote of confidence. The time was not far distant when each would be well repaid for all this weary waiting. Last year's results had been disappointing, and to him at times had caused great anxiety, as he had so many friends shareholders in the company. He wanted the enterprise to be made a success, and no effort would be spared to ensure that desirable end. (Hear, hear.)

The meeting then separated.

PATENT GUNPOWDER COMPANY.

The annual general meeting of shareholders was held at the City Terminus Hotel, Cannon-street, on Wednesday,

General G. V. MAXWELL in the chair.

The report of the directors stated that important progress had been made since the last general meeting in completing the works in North Wales, and erecting sufficient machinery to enable the company to execute the present and increasing demands which are being now received for the patent powder. Influential agents have been appointed, who are obtaining orders, which, although small at the commencement, will, we are informed, lead to large weekly sales. The machinery now possessed by the company for the manufacture of the patent powder in North Wales is capable of manufacturing 20 tons weekly, and every exertion is being made, with very encouraging results, to render our powder known to all the large consumers in England and Wales. With regard to the works at Ewell, the manufacture of black gunpowder has been carried on at a fair profit instead of being, as previously, a dead loss to the company.

The CHAIRMAN said before proceeding to the business of the meeting he had to express his regret that the accounts had been sent out to the shareholders without the signature of the auditors; the accounts were signed only last night, and the time had not admitted of further delay in forwarding the report and balance-sheet to the shareholders. He would now ask the shareholders to consider the position of the company at the time the present board took office. In 1873 the Chairman told the shareholders that everything was going on so prosperously that in the January following they might expect a dividend. Last year, at the annual meeting, the Chairman, Mr. Mellor, told the shareholders that the company had so advanced in its work that it was practically making powder, and that in the course of a few days they would be prepared to sell it. How far that had been borne out might be judged of by the fact that the present board had been compelled to expend upwards of 6000*l*. in buildings, and 2000*l*. in putting up machinery since that statement was made, and that they were only just now beginning to make the powder of which the company had the patents. The present board had had very uphill work—the locality was an out-of-the-way one in which their buildings had been erected; but that was necessary, although the expense in constructing the buildings had thereby been much increased. The winter had been a very bad one, and for some time the roads had been snowed up, workmen could not be induced to stay, the expense of getting one load of timber from Oswestry to the works had amounted to no less than 2*l*. 5s. to 2*l*. 10s. All their difficulties had now, however, been overcome, and the works pronounced by all who had seen them as complete and perfect, and capable of making very large quantities of the patent powder. Mr. Oliphant would tell them the quantity the works would be able to manufacture, and also that several experiments had been made at different quarries, the results of which had been very much better than the most sanguine could have looked for. He then referred to some of the material items in the balance-sheet, and stated that the directors had not disposed of the Ewell property, although it was the wish of the shareholders at one time that it should be disposed of. This property could not have realised its value, and as the directors had the fullest confidence in the intrinsic merits of the patent powder, also that their trade would gradually expand, and foreseeing that the new Act would most probably give them the power of manufacturing at Ewell, and when they had extended their trade since the difficulty there would be in securing a new site, the directors had thought it better not to dispose of that property, but to use it for the purpose of manufacturing the black gunpowder for a time at a fair and moderate profit. They had not done much in extending the works for the manufacture of the black powder, because they intended making the white or patent powder a complete success. (Hear, hear.) He then moved that the report and accounts be received and adopted.

Mr. OLIPHANT seconded the proposition. He stated that when he proceeded to the works in June he, in the first instance, directed his attention to the requirements, ascertaining what orders were likely to be obtained before determining what machinery would be required. He found that the people generally in the neighbourhood of the works spoke very highly of the powder, but expressed some surprise that the matter had not been more energetically pushed, and that more agents had not been sent out, as they had no doubt it would be preferred by the miners from its safety alone, without considering its greater power as compared with dynamite. They found that in the neighbourhood of Festiniog there was being used in two quarries alone upwards of 10 tons of black gunpowder per week, and in one quarry at Penrhyn, where 3000 hands were employed, the workmen stated that the effects of the black powder was not altogether what they desired, inasmuch as it produced a smashing result, whereas what was wanted was rather to lift, making what was technically known as a large "get." He expressed a wish to be allowed to send one of their own workmen to conduct the proposed experiments. The cotton-powder was the only opponent he had to contend with, so there was no difficulty in showing the advantages of the patent powder. So satisfactory was the result that several orders had since been received. As to the experiments at Festiniog, they had been also most satisfactory; the manager expressed himself greatly pleased, and one of the miners who had used the powder was delighted about it. The manager of an adjoining quarry immediately ordered 28 lbs. without the authority of his employers, as he was certain the larger orders would certainly follow. Similarly favourable reports were received from other quarries in the neighbourhood; indeed, in no single instance had a bad report been received from around that important line of country. They had had some reports unsatisfactory, but that had arisen entirely from the parties using it having been unacquainted with the powder. There was one thing absolutely necessary—it must be properly "tamped." One further important feature had been developed—that it could be most successfully employed without the use of detonators, and the "get" of the granite alone, without any other consideration, was greater without detonators than with them. The result of these trials had been that, in addition to the orders given, promises of continuous weekly orders had been made. Besides in North and South Wales, they also had agents in the North of England, who were doing good work, and obtaining orders for large quantities. Indeed, they were now getting orders a little too fast for the machinery, but he had succeeded in purchasing at Manchester, upon most reasonable terms, suitable machinery, which was now on the ground, and its erection would be completed in the course of three weeks. From that time they would be able to manufacture from 10 to 15 tons per week, having plenty of water-power and everything amply sufficient to produce that quantity. He might safely say that in six weeks hence there would be machinery in operation capable of supplying all their demands.

Mr. WEATHERLEY observed that credit had been given for the black powder, whereas the patent powder had not been credited.

The CHAIRMAN explained that the actual trade up till now had been in the black powder only—the real business in the patent powder had not yet been a matter of trade.

Mr. WEATHERLEY congratulated the board upon the very different position of the company as compared with last year; but the explanations of the Chairman placed very serious responsibility upon those gentlemen who sat at the board when the late Chairman (Mr. Mellor) made those utterly untrustworthy statements. He felt very great confidence in the statements made by the present Chairman today, and he believed the company had before it a good future.

Mr. OLIPHANT said the company was now on the verge of prosperity—of commercial prosperity—and would continue so under proper management.

The report and accounts were received and adopted.

Upon the proposition of the CHAIRMAN, seconded by Mr. FARQUHAR, the election of Mr. Courtenay Boyle as director, in the room of Mr. Ashwell, resigned, was unanimously agreed to.

Upon the proposition of Mr. MUSCHAMP, seconded by Mr. NEVILLE, the re-election of Mr. Metcalfe as director was unanimously agreed to.

The consideration of the remuneration to be voted to the directors was postponed till the next meeting.

A vote of thanks to the Chairman and directors closed the proceedings.

WELSH STEAM COAL COLLIERIES COMPANY.

The second annual general meeting of shareholders was held on Tuesday, at the Cannon-street Hotel,

Mr. RICHARD ATTENBOROUGH in the chair.

The SECRETARY having read the notice convening the meeting,

The CHAIRMAN said he would only make a few observations, and they would, perhaps, not be quite so cheerful as those he had made last year, but compared with the prospects of the coal and iron trades of the country generally, the prospects of the company were as bright as possible. When the undertaking was entered upon everything promised very high prices, and everything was looking very cheerful for the coal trade. It was then thought that coals never would come down to the prices at which they formerly were. However, they had lived to see them even lower than that, but with all that they had no reason to be dissatisfied in any way with the property, into the prosecution and success of which they had embarked their capital. It was true that they had met with some greater difficulties and delays than they had anticipated, but they must take it for granted as an absolute certainty in all cases of this kind that no engineer could possibly bind himself to time to carry out his works, nor could put his terms at the exact sum he would propose to realise. In this way they had some slight reason to feel that they were rather in excess of the early estimate, but they must consider the several difficulties they had had to contend with. They had entered into this work at a time when every description of labour was at its highest price. Thinking that the high prices would continue they had, perhaps, put themselves to a greater expenditure than they felt justified in having done at the present moment, but they could not foresee the drop in the sale. They had had to pay a high price for skilled labour, and to press on their work as fast as they possibly could. They were in a remote district, where there was little localised skilled labour; all such labour had to be imported there, and they had to pay rather higher prices than some were paying. This, of course, increased the estimates of the engineer to a greater amount than he thought, and they ought not to blame him either. Everything, however, had been done in a thoroughly business-like, permanent, and substantial manner. The work at Resolven had been much greater than they had anticipated. In taking a colliery of this kind, with an enormous depth of drift-way, they could not possibly arrive at how much water there was in it. They had succeeded in getting down to a great depth, and they had a very powerful pump, and in a very short time they would have the water out and the whole of the colliery working in a satisfactory manner, and that certainly within six months. They had now four headings upon the colliery, and the whole of them would shortly be in full working order. They all promised good coal, as the coal was one of the most saleable kinds in the market, and under ordinary circumstances would pay a very fair profit for getting even in dead times. He had no hesitation in saying that before the end of twelve months they would be getting 50,000 tons annually. In the prospectus the profit on the coal was put at 4s. a ton. He believed that in ordinary times 4s. would be a very fair profit, but he would now put it at 2s. per ton profit, and at this rate it would pay 5 per cent. on the outlay on both collieries. These were the statistics of men made sober by reverses. He now felt much calmed down by the results of the two years' anxiety and work he had had in connection with this colliery, but he believed that it would not be wise because they had had difficulties to be depressed by any difference in the prices of coals and the length of time they were in arriving at the promised thing. Their calculation had been made on a sound basis, and there was not a single thing which had occurred with regard to this undertaking which had given them the slightest doubt of their being able to get the results they had set before themselves. At Clyne they had a treacherous soil and an extremely heavy water-bed and other difficulties, but they had learned by experience. They had all the machinery necessary for going down to the Aberdare seams—the 2000 feet. They had buildings if anything too good. He was afraid they had sanctioned too great an expenditure for buildings, but they thought it was worth while putting up good buildings on this fine property on principle. Whether it would have been to their ultimate advantage to have saved something upon this he did not know, but if they got this colliery to the depth of the Aberdare seams, and returned anything like what they calculated in their prospectus, whether a cottage had cost 10*l*. or 20*l*. more would not weigh much in the balance at all. (Hear, hear.) He firmly believed that they were justified in that expenditure, and he was certain they would live to see their expectations realised. At Clyne they were down a depth of 300 ft., but they should not take that as a criterion of the cost of sinking. The engineer had given a price, which he believed would be within the mark—25,000*l*. to get down to the Resolven seam. He was rather inclined to propose that they should let the sinking at so much per fathom, and he believed it would be taken by contract for less than 25,000*l*. This would be an economical step to adopt at all events, in whatever way they did it, he believed that 25,000*l*. would be the outside of the sum they had yet to spend. They might think they had already spent a large sum. He admitted they had; but, looking at the balance-sheet, he was surprised to see how small a sum they had spent. The capital consisted of 20,000*l*. on which they did not pay interest, and 59,479*l*. received on behalf of the company. For this they had the Resolven Colliery, which at the most moderate calculation would pay 5000*l*. a-year. They had the whole machinery in working order, the freehold of the lands on which they were sinking at Clyne, the whole of the sidings, and the machinery on the property for going down to the very lowest seam of coal. In the prospectus they proposed to raise 100,000*l*. first of all, and another 100,000*l*. at a future date, when they got down to the Aberdare seam. He would like to have the 100,000*l*. taken up in ordinary shares, but as there was a difficulty in having this done it would be unwise to injure the prospects of the colliery by not proceeding with it vigorously; and if they could not get this by ordinary shares he did not see why they should not do so by preference shares. The undertaking was in as healthy a position as when it was taken up. They were not so sanguine as then, because the coal trade was not so good, but the condition of the company was in the same satisfactory state. They had raised 60,000*l*.; they wanted 50,000*l*. more to sink and to put the company into thorough working order. The moment trade revived they could make 25,000*l*. out of the Graig Isha level; and if the iron trade should revive, as it is thought it will do in six months time, they could show a profit before they had commenced to sell the Resolven coal. If they got down to the Resolven coal during the next 12 months, and produced the 50,000 tons, they would have an income of 10,000*l*. a-year. He did not believe that the shareholders at the moment realised the result of their undertaking, for they have the same valuable property they had when they went into it. The patent fuel would also be a source of great profit if they could put up the works, but until they got down to the Resolven seam he did not think they should put up these works. The directors had had very long deliberations as to the interests of this company, and he did not think they were anything like remunerated for their labour, but in order that every shilling should be saved until the company was paying a fair dividend he believed that the directors would willingly give their services for next year without any charge to the company. (Applause.) He wished them to believe that the directors had nothing but the interest of the shareholders at heart, and that they were willing to do everything to promote it. Everyone who saw the property was perfectly satisfied that they had the seams of coal there, and that that it only required working in a business-like way to produce a very magnificent income. He wished he could tell them when they could get at it, but it partly depended upon money, and the state of the labour market, and the various strata, but having had the experience of the last 12 months they felt they were in a position to say that they believed that the whole of this property was likely to be developed, and to turn out quite as rich in coal and in the quantity of mineral as they anticipated, and that it is capable of being worked at a handsome profit. They saw the final attainment of their object within their reach. The Chairman then moved—"That the report and balance-sheet be received and adopted."

Mr. MOY seconded the resolution, which was put to the meeting, and carried unanimously.

The CHAIRMAN next moved "That the directors be authorised to borrow the sum of 50,000*l*. upon debentures, bearing 6 per cent. interest, and to be secured upon the company's property in such a manner as may be deemed advisable, and that such debentures be offered to the present shareholders *pro rata*, according to their present holdings."——Mr. BIRCH seconded the resolution, which was put to the meeting and carried.

Mr. HATCH proposed the re-election of Mr. Thomas Moy as a director. Speaking as one who had been down at the property, he said that no one who had been there could help being impressed with the fact that there was full value there. He was in favour of issuing debentures, and he would stick to the concern until they got not only 5 or 6 per cent., but as much as 25 per cent.

The CHAIRMAN: That this quite within our reach I am sure.

Mr. SALISBURY seconded the resolution, which was put and carried.

Mr. MOY thanked the shareholders for this mark of their confidence, and said that Mr. Hatch's view of matters was very satisfactory to the board.

Mr. HATCH then proposed the re-election of Mr. W. S. Black as a director, which was seconded by Mr. PRESLAND, and carried.

Messrs. Harding, Whinney, and Co. were next re-elected as the auditors of the company, and after a vote of thanks to the directors and officers the meeting separated.

BROOKWOOD MINING COMPANY.

At a general meeting of adventurers, held at the purser's office, Liskeard, on Tuesday (Mr. J. C. ISAAC in the chair), the accounts presented for 16 weeks to April 23, showing a profit of 804*l*. 16s. 10d., and also a balance in favour of the adventurers to the same date of 1030*l*. 15s., were allowed and passed, and a dividend of 4s. per share declared and paid. The following report was presented:—

July 20.—We have driven on the lode at the 120 east 7 fms.; the lode is large and spare for exploring, and very wet, and at this time yielding some saving work, worth about 5*l*. per fathom. The lode in the 110 east is 2½ ft. wide, worth 8*l*. per fathom, and from its general appearance and the character of the ground I still expect an improved or better lode. The lode in the 110 west is 6 ft. wide, worth 12*l*. per fathom. The lode in the 100 east is worth 10*l*. per fathom; we have suspended the rise in this level, and hope to make a communication from the 90 in a short time, and hence lay open some good ground for stoping in this direction. There is one stope in back of the 100 east; lode worth 4 tons, or 20*l*. per fathom. The lode in the 90 east is 5 ft. wide, and worth 10*l*. per fathom; ground eased for driving, and 5 fms. more will reach the rise from the 100; then by sinking 9 ft. we shall make the communication. We have resumed operations at the 80 east by securing the level, in which a slight break in the stull has occurred, and have an idea that the shoot of ore in the 90 is before the 80 end, and soon this point, which is one of interest, will be proved. We have several stopes working in back of the 110, 100, and 90, which are producing about the usual quantity of ore. On the whole, I consider the mine in a sound and healthy state, and although the ends are not so rich as formerly reported, yet by the discovery in the eastern ground in the levels reported the mine is looking favourable for a general improvement, and with present price of copper I see no reason to doubt of having the usual dividends. —T. TREVILLION.

BEDFORD UNITED MINING COMPANY.

At a general meeting of shareholders, held on Wednesday, the accounts made up to the latest convenient period showed a cash balance in hand of 564*l*. 7s. 6d., and an estimated balance in favour of the company of 326*l*. 13s. 1d. The chair was occupied by Mr. J. HITCHINS, who briefly referred to the satisfactory statement of accounts then submitted to the shareholders, and said he hoped that the improved prospects of the mine were indicative of brighter days for the shareholders.

Capt. PHILLIPS was present, and said he met the shareholders that day with the impression that the worst was past, and that his co-adventurers were about to be rewarded for their enduring patience and outlay. The mine was looking exceedingly well, and he hoped to be able to keep up present returns for some time to come, and to place the mine in a position to make some return to the adventurers.

The accounts were passed, and the agents report adopted.

The SECRETARY, in answer to a shareholder, stated that he believed every item was charged up to June 19, and no further liability had been incurred beyond current expenses than appeared in the accounts then before the meeting.

The agent's report was read, as follows:—

July 20.—North Lode: The shaft is sunk to the 115, upon the south part of the lode, and this level driven upon it 15 fms. east and the same distance west of the shaft. Cross-cuts have been driven to intersect the north part of the lode, whence our late returns of ore have been principally obtained, and which have enabled us to improve considerably upon our estimate at the last meeting. We are now stoping on the north side of the shaft, where the lode is worth fully 8 tons of ore, or 40*l*. per fathom, with a fair promise of continuous returns for some time to come. Preparations are being made for sinking the shaft to another level, in order to reach the junction of the north and south parts of the lode. At this junction I have every reason to believe will be found a permanent and great course of ore. The shaft being in the middle of a valuable run of ore ground, fully 50 fathoms in length, I recommend its being sunk with all speed. The sump-winze, about 20 fms. east of the shaft, in this level, is being sunk between the two parts of the lode to reach the junction already referred to. In the 115 east the lode is 4 ft. wide, worth 20*l*. per fathom. The 115 west is being driven by the side of the lode, and is promising for a discovery, seeing that the level above passed through some valuable ore ground at this point. In the 103 east the lode is large, producing saving work, and promising for improvement. The stopes in bottom of this level are yielding on an average about 20*l*. worth of ore per fathom. The 103 west is about 60 fms. from shaft on the south part of the lode; at this point a cross-cut is being put out to intersect the north part of the lode, and from present appearances I have reason to expect it will be found productive.—South Lode: The rise is communicated with the old workings, and as soon as the debris is cleared away future operations will be decided upon. Many hundreds of fathoms of ground have been laid open on this lode, which will ultimately be available for stoping, and I am still of opinion that this lode will, as development progresses, prove to be a source of very profitable returns to the adventurers. In conclusion, I beg to congratulate the shareholders on the improved prospects of the mine, and venture to say that in the next four months satisfactory profits will be made, and which will be available for the purpose of extending the development of the property, or to be dealt with as the shareholders may advise.—WM. PHILLIPS.

A vote of thanks to the Chairman concluded the proceedings.

'For remainder of Meetings see to-day's Journal.]

HYDRO-PNEUMATIC MOTOR.—The invention of Messrs. FISHER and RUTHERFORD, of Newcastle-upon-Tyne, relates to the application and use of a column of water to transmit the power obtained by the expansion of heated and compressed air to the work to be done and the utilisation of the heat in the rejected air. For this purpose air highly compressed is heated in a furnace and then passed into a chamber where it comes in contact with a column of water, the pressure and expansion of the air operate upon the column giving motion to it, which motion can be communicated to a reciprocating piston, or other mechanical arrangement for converting or applying power. The improved engine is composed of three essential parts—an air compressor, an air heating furnaces or apparatus, and a working chamber or chambers.

VENTILATING UNDERGROUND RAILWAYS.—Mr. JOSEPH DIXON, of New York, proposes to divide the tunnels into sections of a mile, to place midway of these sections a suitable fan-blower, connected by suction-pipes, extending right and left into the tunnel, and to place partitions, by means of pivotted doors, across the tunnel on either side of said suction-pipes, said partitions occupying the entire space crosswise of the tunnel; pending the arrival of a train, said partitions to remain closed. The doors may be opened by an approaching train, and closed again immediately after the train has passed, by the train itself operating suitable mechanism placed alongside the track. By thus dividing the tunnel into sections, and placing the ventilating apparatus midway outside the tunnel, the fan withdraws the foul air from (say) half a mile of tunnel on the left hand side, and at the same time, and by the same operation, it also acts in a like manner on the length of tunnel on the right hand side, and discharges the foul air from both sections through a pipe of suitable size on the opposite side of the fan to the surface of the earth, and thence up a suitable height above the surface by an ornamental hollow column.

MINING ON THE PACIFIC COAST—GREAT FEAT OF MINE ENGINEERING.

A gigantic piece of engineering work—a 15-mile flume, costing 50,000*l.*—has been carried out within the past 10 weeks by Mr. Gottl. Haist, in Storey county, Nevada, and on July 1 the first stick of timber was floated from the summit of the Sierras and landed at Huffaker's Station. The Pacific flume is one of the most colossal fluming enterprises ever undertaken on the Pacific Coast, but although it involved considerable engineering difficulties, and cost no less than 50,000*l.* to construct, it was completed in the astonishingly short period of 10 weeks. From the very lengthened account of the opening given in the *Virginia Evening Chronicle*, it appears that the Pacific Wood, Lumber, and Flume Company is practically composed of Messrs. John Mackey, J. G. Fair, J. C. Flood, and W. S. O'Brien, and that it is for the purpose of supplying their mines and mills that the flume has been built. Instead of relying upon outside sources for their wood supply, they have now at command a timber tract which will, according to careful estimates, yield 100,000,000 ft. of saw logs, 30,000,000 ft. of hewn timber, and 600,000 cords of firewood. An expense of over $25,000 has been incurred in acquiring the land and building the flume, but the outlay will be nearly made up by the saving in the price of wood for a single year. The mills of the Pacific Mill and Mining Company—comprising the Bacon, Trench, Occidental, Kelsey, Devil's Gate, Hoosier State, Consolidated Virginia, Sacramento and Mariposa mills—will all draw their supplies of wood from the lands tapped by this flume. The Consolidated Virginia, California, Hale and Norcross, Gould and Curry, Best and Belcher, and Utah mines will all receive their timber and fuel from this source. These mills and mines consume about 40,000 cords of wood per year, and when it is remembered that firewood costs from $11 to $12 per cord, and timber from $22 to $24 per 1000 ft., the vast saving to be made by having a supply within their own control will be at once apparent.

The energetic superintendent of the Pacific Mill and Mining Company, Mr. John B. Hereford, having thoroughly explored the wooded summits of the Sierras, and secured some 12,000 acres of excellent timber for the company, placed the work in the hands of Mr. Haist, who has since worked most energetically; and as there was unlimited capital at command delay was unnecessary. Roads were built up the mountain sides, and teams set to work hauling machinery for two mills. The snows came just as this was began, and much of the machinery was dragged up the Sierras in 4 or 5 ft. of snow. The first mill was erected on the middle fork of Evans's Creek, about half-way up the mountain side. The second mill is over two miles higher. Everything, timber, tools, and machinery, were dragged up by immense teams of oxen and horses. While it was possible to work during the winter the mills were kept going upon material for the projected flume.

The flume, which is V-shaped, is made of 24-in. planks, 2 in. thick, and has a capacity of at least 500 cords of fire-wood per day, or of 500,000 ft. of timber. In several respects it differs from any flume yet constructed, and has been rather more expensive in consequence, as it is intended to last at least 12 years. To gain a uniform grade (an indispensable requisite in so precipitous a country, where heavy timber is to be floated) it was found necessary to build the flume on trestlework and stringers from one end to the other. The trestlework, which in some places is 48 ft. high, is substantial enough to support a narrow-guage railroad, it being thoroughly braced longitudinally and across, so that no break can extend further than the length of a single box—16 ft. All the main supports, which are 5 ft. apart, are firmly set in mud-sills. The boxes rest in brackets placed 4 ft. apart. These again rest upon the substantial stringers.

The engineering difficulties consisted mainly, of course, in the mountainous character of the country. Even in the foot hills—where to find a good course would seem an easy matter—the ground is broken by gulches and steep declivities, with outlets running at right angles to the direction of the flume. At some points the great canyons have made the matters of grade and turn problems of serious difficulty, only to be overcome by the highest engineering skill, and high and heavy trestle work. The flume commences in the Truckee Meadows, at Huffaker's Station. Thence it extends across the valley and the foothills in a south-westerly direction for 5 miles. The course then changes to the north-west to the base of the mountains, a distance of 8 miles. From the foot of the mountains the flume winds up through the gorges and canyons on an average grade of 16 in. to 16 ft.; the sharpest fall is 3 ft. in 6, which, however, is only for 200 ft. The grade above this fall is gradually accommodated, so that the force of the descent is much diminished. This really marvelous evenness of grade makes a jam—that bugbear of most flume works—almost impossible. The whole distance from beginning to end may be ridden in safety in a boat.

In order to procure a good view of the whole flume the reporter undertook a boating trip down it. By nailing a piece of board at the end of one of the V boxes being floated down to the workmen a very good boat is made. A strip of wood placed across furnishes a seat, and then the voyager can go down the flume or to destruction, as luck has it. The traveller having seated himself in this new-fangled craft sped away at the rate of 20 miles an hour, the landsmen shouting after him to kick the stern out of his boat if he was in any danger and wanted to stop. This summary way of dealing with the boat allows the water to flow through it, and consequently diminishes the speed and drenches the unfortunate boatman. For the first mile or two the navigator smoked his cigar comfortably, and enjoyed the novel sensation of spinning along at an elevation of from 20 to 40 ft. through a thick pine forest, with the water swishing and gurgling fore and aft, and no rowing to do. Twenty miles an hour was well enough, but it suddenly was brought to the notice of the mariner that he was going down hill, and with what looked like a perpendicular descent before him. This was the dreaded "half-mile curve," the sharpest fall of the flume. Before the startled boatman could place a precautionary hand upon his hair, or gasp a fragment of prayer, the boat shot out like a bullet from a gun, and in five seconds the hatless reporter, with his eyes starting from his head, and a death-like clutch on the sides of his vessel, found himself gently voyaging along a quiet level, and was joyfully received by Mr. Haist, who stopped the boat, and informed the bold voyager that he had done what no other human being had been known to do and live—gone over water at the rate of about 60 miles an hour.

In just ten weeks all the trestle work, stringers, and boxes of this immense flume have been put in place. The method of construction has been as simple as rapid. At various given points water could be turned on, and as the boxes were laid others were floated through, and the flume would float the material for its own creation. The greatest day's work was ½ mile. Four gangs of 30 men each have done the work. It has required 2,000,000 ft. of lumber and 20 tons of nails to build the flume. The main supply of water is drawn from Hunter's Creek, which is diverted from its bed near the source by dams, and its waters collected in two reservoirs. The reservoirs are models of solidity. The upper one is 600 ft. long, with an average depth of 10 ft.; the other is 1100 ft. long, with a depth of 10 ft. A ditch nearly 2 miles long brings the water to the first reservoir, whence it is conveyed 3¼ miles to the flume by means of a feeder, which is a strong square box well braced, capable of carrying 450 in. of water. A stream of pure water, large enough to supply Virginia city, rushes through this feeder. There is another feeder of the same capacity, 4 miles in length, which drains Thomas's Creek and connects with the flume half way down the mountain. The purpose of this second immense feeder (through which an amount of water equal to the first flows) is to supply whatever waste may have occurred down to its point of junction. Heavy timber dashing down the grades, when making the sharper turns, throws out considerable water. In addition to this Thomas's Creek feeder, there are many smaller ones which catch the waste water and give it back to the flume at points lower down. The supply can be regulated to a nicety by means of the dams and waste gates in the feeders. The company have more water at command than they can possibly use. In the event of a scarcity, however, Hereford Lake, a beautiful sheet of water resting in a dimple on the mountain top, can be drawn upon.

The timber thickly covering the 12,000 acres owned by the company is mainly fir, yellow pine, and tamarrack. Mr. Hereford calculates that he will be able to obtain from the forests 500,000 cords of firewood and 100,000,000 ft. of saw-logs, of an average diameter of 28 in., and 30,000,000 ft. of hewn timber. There is now ready for fluming 20,000 cords of seasoned firewood, and 3,000,000 ft. of square hewn timber. Mr. Hereford intends to land this vast quantity of wood at the mills in Storey and Lyon counties during the present season, with an additional 15,000,000 ft. of square timber. The saw mills which are to reduce the great body of timber to firewood and logs are first-class in all their appointments, giving employment directly and indirectly to between 400 and 500 men. The lower mill on Evans's Creek is kept running night and day, and has a capacity of 50,000 ft. per day when working upon small stuff, and when on large timbers 70,000 ft. The upper mill is run but 12 out of 24 hours at present. Its capacity is 15,000 ft. of small, or 25,000 ft. of large timber per day. The whole work has been conducted on the most colossal scale. Over 50 miles of good wagon road have been built through the mountains for hauling the necessary materials for the construction of the flume. The highest point of the flume from the plain is 3700 ft., and on an air line from terminus to terminus the distance is eight miles, which gives seven miles of twists and turns. There are to be three forks at the Huffaker landing, and telegraphic communication with the shipping points. By these means each kind of wood and timber can be floated and landed separately. From Huffaker's the wood will be conveyed to this city by the Virginia and Truckee Railroad. Special tracks are laid to the terminal forks, and every convenience for rapid transit arranged. It is pleasant to record that, notwithstanding the danger involved in the heavy mountain, not a single man had been injured. Mr. Hereford intends to extend the flume 5 miles further into the mountains this season; and if the thing can be done, the energy which has in so short a time overcome so many stupendous difficulties in carrying out this great enterprise to a successful issue will accomplish it.

FOREIGN MINING AND METALLURGY.

In the French coal trade no large contracts are reported, business is only done to meet the urgent requirements of consumption. The period of the year through which we are now passing is generally inactive, and this year more than ever the French collieries are feeling the consequences of the deplorable condition of French metallurgical industry. Colliery owners have attempted to resist the consequences of the want of business by reducing production as much as possible. They hope by this means to check the fall in prices which has been making rather rapid progress of late. They have succeeded in nearly maintaining prices, but they have not succeeded in developing business. For the moment the market is almost completely dead, and it is only in a month, or a month and a half, that there is any chance of a revival. At Paris there has been only little doing in coal. A report of M. Krantz, generally favourable to the Channel Tunnel scheme, has received a qualified support from a commission appointed to study the question. An Anglo-Spanish company has been formed for the construction of a submarine tunnel in the Straits of Gibraltar, between 8 and 9 miles in length.

The difficulties of the French iron trade cannot be said to have terminated; but, on the contrary, there are complaints on all sides of the precarious condition of the French metallurgical industry. The St. Dizier group, which had hitherto put a good face on matters, begins now to reflect the general depression. There are complaints, for instance, that only a few orders for immediate execution come to hand, and that no long-termed contracts are offered. The works which apply themselves to the production of sheets in the St. Dizier district are still fairly employed. First-class coke-made sheets have brought 8*l.* 4s.; ditto charcoal-made, 11*l.*; ditto mixed, 10*l.* 10s. 6d. per ton. In the Nord business appears to be still falling off. In the Meurthe-et-Moselle quotations remain at about the same level. Pig for refining, ordinary quality, has made 2*l.* 16s. 10d. per ton; No. 3 grey pig, for second fusion, 3*l.* 12s. 10d.; and No. 1, 4*l.* 5s. 10d. per ton. At Paris the iron market is in a very quiet state. The great forges of the Nord officially maintain quotations at 8*l.* 4s. per ton, and this price is supported, notwithstanding any opposing efforts on the part of intending purchasers. The consumption of iron upon the Paris market is a good deal restricted, and is confined to some indispensable re-assortments. An international exhibition of maritime and navigation industries is being held at the Palais de l'Industrie, at Paris, and will last until Aug. 15. All industries are represented, and especially metallurgy.

Prices of copper have not varied at Paris. Chilian in bars, with delivery at Havre, has made 86*l.*; ditto, ordinary descriptions, 85*l.*; English tough cake, 89*l.*; and pure Corocoro minerals, 86*l.* per ton. At Havre Chilian has been rather feeble; the Marseilles copper market has also been very quiet. The German copper markets have exhibited no great amount of firmness. Tin has been comparatively neglected upon the Dutch markets; Banca has been dealt in at 50 fls. to 50½ fls.; disposable Billiton has brought 48 fls.; Straits has fallen to 86*l.* at Paris; English has made 90; and Banca, 91*l.* 4s. per ton. Tin has also been neglected upon the German markets. French lead, delivered at Paris, has been quoted at that centre at 22*l.* 8s.; Spanish, delivered at Havre, at 22*l.* 8s.; and English, delivered at Havre, at 22*l.* 4s. per ton. The German tin markets have been generally well maintained; nevertheless, business has been quiet. There has been a slight reaction in Silesian zinc at Paris; Silesian, delivered at Havre, has made 25*l.*; other good marks, 24*l.* 18s.; and ditto, delivered at Paris, 25*l.* per ton. The German zinc markets have been generally firmly maintained, but the amount of business passing upon them has been comparatively limited.

There has been little or no variation in prices in the Belgian coal trade, and no important transactions have been concluded. Contracts for long terms are generally refused, colliery owners preferring to make concessions for immediate delivery rather than to enter into future engagements. An official report from the pen of M. Van Scherpenzeel-Thim has just appeared with reference to mining and metallurgical industry in the province of Liége in 1874. It appears from this report that the coal production of the province of Liége in 1874 amounted to 3,530,000 tons, showing a falling off of 143,000 tons, or about 4 per cent., as compared with 1873. The diminution was much more sensible in the value of the production, which amounted last year to 2,240,000*l.*, as compared with 2,991,360*l.* in 1873, showing a decline of 24 per cent. last year. The value of the production of 1874 still exceeded, however, that of 1872 by 442,920*l.* Upon the whole, the position of the collieries of the province of Liége must be said to have been tolerably favourable last year. The exports of coal from the province last year were 264,000 tons, against 289,000 tons in 1873; the exports of coke last year were 260,000 tons, against 219.000 tons. The exports were, however, smaller last year than in 1872. The number of workmen employed in coal mining industry last year in the province of Liége was 26,016; the expenditure in wages last year was 1,221,767*l.* The amount of work done per man appears to have declined last year, and the cost price of the coal raised was accordingly 1s. 0½d. per ton more. The gross profits realised from coal mining last year in the province were 268,280*l.*

M. Van Scherpenzeel-Thim, engineer-in-chief and director of mines in the province of Liége, in reporting upon the iron trade of that province last year, states that the production of the ironworks only declined to the extent of 6000 tons, or 3½ per cent., in 1874, as compared with 1873, although the value of the production effected declined last year 480,000*l.*, or nearly 24 per cent. The competition of Luxembourg pig reduced the production of rough pig in the province of Liége to the extent of more than 37,000 tons, as compared with 1872. The production of steel in the province last year is returned at 20,953 tons, against 19,056 tons in 1873; the slight advance realised last year does not respond to the continuous progress observable in the consumption of steel in Europe. Iron minerals were consumed last year in the province to the extent of 377,000 tons; native minerals figured in this total for 203,526 tons; minerals of the Grand Duchy of Luxembourg for 135,820 tons; and African and French minerals for about 20,000 tons. The number of workpeople employed in the ironworks of the province last year was 650 less than in 1873, although the number of establishments in activity remained unaltered. The aggregate value of the production of pig and iron in the province last year was 2,810,224*l.* The extraction of iron minerals appears to be rather declining in the province.

THE CANADIAN OIL WELLS CORPORATION.

The result of Sir John Hay's appeal against the decision of Vice-Chancellor Malins in the matter of the Canadian Oil Wells Corporation has already been reported. The Court of First Instance, upon the application of the official liquidator, had directed that the right hon. baronet should be put on the list of contributories as liable to a payment of 1000*l.*, in respect of 40 shares of 25*l.* each, although the shares of Sir John were described in the company's books as fully paid-up. The Lords Justices affirmed the Vice-Chancellor's decree. In the course of his judgment, Lord Justice James said it appeared that certain gentlemen were minded to induce the English public to buy for a very large sum certain oil wells and plant in Canada, which could only be done by getting up a joint-stock company for the purpose. In this state of things these gentlemen applied to a body of English gentlemen of position, and said to them "Pretend to be shareholders, pretend to be promoters, pretend to have made a contract with us, and invite the world to join you as shareholders, and invite them to believe that you are the promoters, and to participate with you in the contract which you will pretend you have made. We will find you the shares, we will indemnify you against all the expenses, we will have the contract made by ourseves cut and dried ready for signature, and we will give you a part of the purchase-money which we are to receive in money or shares, and besides that, you will have your profits as directors of this company." And that body of English gentlemen consented and condescended to become the hired retainers on these terms of some unknown adventurers from the other side of the Atlantic. In pursuance of this arrangement they signed a Memorandum of Association, by which they stipulated to take shares, and became liable to take shares. In pursuance of that arrangement a contract, which was conditional in form, was made complete by these gentlemen. Money appeared thereunder to have become payable—a large sum in money and a large sum in shares. While this thing was *in fieri*, and still incomplete as far as regarded payment of the money to the vendor or the agent of the vendor, these gentlemen, as directors of the company, met at the board of the company, and there, in payment of that part of the consideration which was to be paid to one of them (Sir John Hay), his co-directors drew a check for 1000*l.*, and he drew two other checks for two other persons in the same condition as himself for 1000*l.* each, that being in exact accordance with the stipulation which they had made—that their shares were to be found and paid for by the vendors. The 1000*l.* was given to Sir John Hay, and a check was given to each of the other gentlemen in the same position. It was never intended to be and never did become under the control or power of the vendors. It never left the board-room, but was immediately endorsed as intended, and according to the bargain in favour of these gentlemen by the agent of Prince, the principal vendor. It was a check by which the money of the company was taken by one of the directors by the authority and with the consent and knowledge of his co-directors out of the moneys of the company for the purpose of paying that which was a bribe to him for having sold the company in the transaction. No right to that check ever passed to Prince or Longbottom; no right to that check ever passed to Sir John Hay. It never, in the contemplation of that Court, ceased to be the property of the company. With that money, the property of the company, so taken by a director out of the funds of the company, the calls on the shares were said to have been paid. Of course, the money could not be so applied. The calls never had been paid, and Sir John Hay had rightly been made liable by the Vice-Chancellor to pay for those calls as unpaid. No agent in the course of his agency could derive any benefit whatever without the sanction or knowledge of his principal. That was a principle repeated by him, and it had been repeated most emphatically by the Full Court of Appeal in the case of "Parker *v.* M'Kenna." (L. R., 10 Ch. App.) He again desired to repeat that that Court would never sanction anything of that kind, and would make the persons who engage in schemes such as that which had been brought before them pay back to the uttermost farthing whatever they have received.

Lord-Justice Mellish was entirely of the same opinion. There was no doubt about the rule of the Court that an agent could not be allowed to make any profit out of the matter of his agency without the knowledge and consent of his principal, beyond his proper remuneration as agent. It was perfectly settled law that that rule applied with peculiar stringency to the directors of all joint-stock companies, who are the agents of the company for carrying out the sales or the purchases made by the company; and the only question in the present case was whether that principle applied to it, and whether Sir John Hay had made a profit out of his agency without the knowledge of his principals for which he was accountable in that Court. Having regard to the nature of the bargain by which a payment was to be made to Sir John Hay for becoming a director out of the purchase-money ultimately payable, it was impossible that such a transaction could stand in that Court. The directors, including Sir John Hay, were servants and agents of the company for the purpose of making these payments in money and shares to the vendor. It was their duty to see whether that contract ought to be carried out or rescinded. As trustees they had this most important duty to perform to their *cesqui que trusts*, the shareholders; but, having this duty to perform, they entered into an arrangement with the vendor to receive back part of the money which they had to pay him on behalf of the company. In the circumstances the company were entitled to say that the check with which Sir John Hay had paid his calls had never become the property of Prince (the vendor) and that there had been no valid payment by Sir J. Hay in discharge of his liability.—The appeal must be dismissed with costs.

LIABILITY FOR ACCIDENT IN A COAL PIT.—An action of some importance to coalmasters and their workmen was decided in the Hamilton Sheriff Court on Saturday. The pursuer was Wm. Wilson, miner, Larkhall, and the defenders Neil Cochrane and Co., of Millburn Colliery, and Abraham Thompson, their manager. The summons concluded for the sum of 50*l.*, in name of damages, in consequence of an accident alleged to have been sustained by pursuer in defenders' pit on Oct. 24. It was pleaded in defence that the accident occurred through the fault of pursuer's fellow-workmen, and that therefore the defenders were not responsible. It seems that on the day in question the pit-rope had got out of order owing to its having been improperly used for the purpose of hoisting a bell-crank of 2 tons weight, and that in consequence the cage in its descent fell upon the pursuer. A week before this accident pursuer had got himself hurt in another pit, and the second injury was stated to have been aggravated by the first. It was Thompson, the manager, who had directed the pithead men to raise the crank; and the Sheriff-Substitute (Spens) found him liable, assoilzing the company, who were held to have exercised proper care in having selected for the oversight of their colliery a person duly certificated. Expenses were awarded to Neil Cochrane and Co., and the damages against their manager were assed at 5*l.*—each party paying their own costs. A joint appeal was taken to the Sheriff-Principal, who, in an interlocutor issued on Saturday, adhered to Sheriff Spens' interlocutor.

NEW USE FOR TIN.—The following is MR. HEEREN'S process for giving iron wire the appearance of silver. this is done by a thin film of tin. The iron wire is first placed in hydrocloric acid, in which is suspended a piece of zinc. It is afterwards placed in contact with a strip of zinc in a bath of two parts tartaric acid dissolved in 100 parts of water, to which are added three parts of tin salt and three parts of soda. The wire should remain about two hours in this bath and then removed, and made bright by polishing, or drawing through a polished iron. By this galvanic method of tinning, wire which has been wound in a spiral, or iron of other shape, can be made quite white, which is an advantage over most other methods, where the wire is tinned in the fire and then drawn through a drawing plate.

BOILER FURNACES.—The object of the invention of Mr. E. MILNER, of Clayton, near Bradford, is to facilitate the combustion of the smoke produced by the combustion of the fuel in steam-boiler and other furnaces, and thereby to effect increase of the heating power obtained by such combustion and economy of fuel. In addition to the ordinary fire bars other sets or series of fire bars, supported a short distance below those for the support of the fuel in the ordinary way are employed, extending from about the front end of the furnace to about the same distance back as the ordinary bars, and of corresponding extent in width. A space is left between the inner ends of both series of bars and the back of the furnace or the fire-bridge, varying in extent with the size of the furnace, but say generally of from 3 to 6 in. for the passage of air up from below to act on the smoke and heated products passing from the fire. A guard is provided to the inner ends of these ordinary fire bars to prevent the fuel from being pushed or falling over and through the opening referred to.

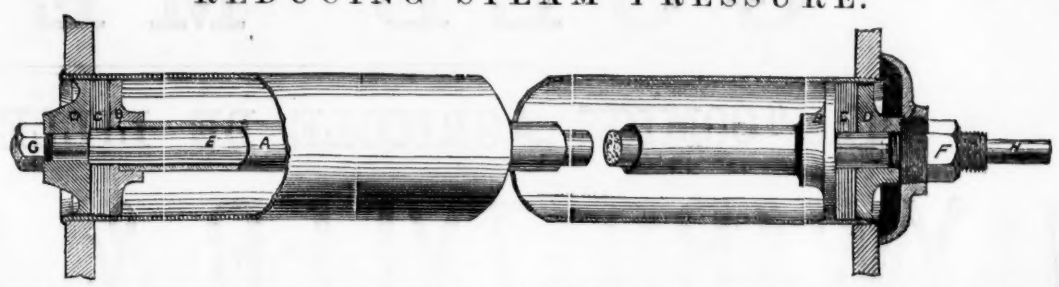
IMPROVED GAS ENGINE.

The cleanliness and compactness of gas engines, and the facility which they offer for the generation of power for short periods and at irregular intervals, has led to their being extensively used in many cases, when steam would be the reverse of economic, if not altogether inapplicable; and a large number of inventors have turned their attention to their improvement. Among the most recent inventions is that of Mr. G. W. Daimler, of Mülheim, which consists in the use of a water-jacketed cylinder, open to the atmosphere at both ends, and containing, firstly, a working piston connected by a piston-rod, cross-head, and connecting-rods to an engine-shaft; and, secondly, two other pistons, one on each side of the working piston. These latter pistons are loose in the cylinder, and operate thus. Assuming the working piston to be at the end of its back stroke, resting closely against the back loose piston, and with a space intervening between it and the front loose piston, into which space an explosive mixture of air and gas or petroleum vapour has been drawn from an inlet valve; then, on the ignition of the explosive charge, the front loose piston is propelled rapidly to the front end of the cylinder, where it is retained by an arrangement of expanding wedges which wedge it tight in a conical enlargement at the ends of the cylinder.

A partial vacuum being thus produced in the cylinder by the expansion and cooling of the products of combustion, the working piston, and with it the back loose piston, is caused by atmospheric pressure to travel towards the front end of the cylinder. The working piston carries a sliding rod, which, as it approaches the front loose piston, comes in contact therewith, and also with the back loose piston, and thus arrests the motion of the latter, while the working piston continuing its motion to the end of its stroke causes a space to be formed between it and the back loose piston, into which a fresh charge of gas and air is drawn through a second supply valve. The charge being ignited, the motions of the several pistons are effected in the manner above described, but in the contrary order and direction, the front loose piston which was before wedged tight being again freed so as to return with the working piston by being pushed outwards by the latter, whereby the wedges in becoming free are contracted by springs. The working piston in approaching the front loose piston expels the products of combustion from between them through a discharge valve in the cylinder, and buffers are provided at each end of the cylinder, against which the working piston presses the loose piston, so as to expel all the gas, and insure a close contact between them.

The supply of gas and air to the cylinder is effected by a conical valve at each end having passages in its stem through which gas and air enter the valve-box when the valve is open. The ignition of the charge in the cylinder is effected by a disc on the valve stem which, as the valve closes, carries a portion of flame from a gas jet into the valve chamber, at the same time cutting off the communication between the valve chamber and the gas jet. The supply valves are opened at the proper times for the admission of gas and air by means of cams on the engine-shaft, and are closed by the action of springs. For working the engine by petroleum vapour instead of coal gas, the liquid petroleum is caused to flow in a small stream into a pipe in the water-jacket of the cylinder, where it becomes vaporised by the heat of the water, and is then conducted to the supply valve. The air supply is in this case also caused to pass first through a pipe in the cylinder jacket to become heated. The power of the engine is regulated by means of a governor in such manner that when the speed of the engine is too great the supply of combustible gas is entirely cut off, and the engine performs its strokes without any explosion af gas and air until the speed is again reduced. This effected by means of a valve, the stem of which is raised or lowered by the governor so as to bring a head upon the stem either above the projection on the face of the bevel-wheel on the engine-shaft (in which case the valve is open), or below the projection, in which case an incline on the projection closes the valve. A flap valve is also provided in the supply pipe for preventing more than the requisite quantity of gas from entering the cylinder. The piston and piston-rod are cooled by the circulation of water therein, the water being made to enter from the water-jacket of the cylinder into a branch pipe on the front end of the piston-rod, the branch pipe having a small receptacle on its end, which is made to open a valve in the water-jacket when the piston-rod arrives at its end strokes.

CLOSING FRACTURED BOILER TUBES WITHOUT REDUCING STEAM PRESSURE.



CLOSING FRACTURED BOILER TUBES WITHOUT REDUCING STEAM PRESSURE.

The inconvenience and annoyance resulting from the fracture of a boiler tube whilst the boiler is in actual use is but too well known to practical men, and it is, therefore, by them especially that the very simple and ingenious contrivance invented by Mr. W. Boaz, of Limehouse, will be appreciated. The old practice of drawing the fires in order to enable a man to enter the combustion chamber and stop the damaged tube with bar and plug is altogether dispensed with, and the injury repaired even without stopping the engines. The precise character of the apparatus will be best understood from the annexed illustration, in which A is a small tube of given length; B B, flanges at each end thereof; C C, vulcanised india-rubber washers on each end, cased in copper; D D, flanges on outside of india-rubber washers; E, a bar of iron passing through the small tube, A, and screwed at each end; F, gun-metal nut on end of bar, to be screwed up for drawing flanges together, and expanding india-rubber washers; G, nut on back end of bar for disconnecting the apparatus; H, a square on end of bar to be held stationary while the nut, F, is screwed up; I, gun-metal shield, which is screwed on nut, F, to prevent the possibility of any water or steam escaping while tightening the apparatus. The method of applying the apparatus is extremely simple; it is passed through the leaky tube from the front end of the boiler, and the nut, F, is then screwed up. This expands the india-rubber washers, making the leaky tube perfectly tight at each end; the shield, I, effectually protecting the hands from scalding whilst the apparatus is being fixed—the whole operation is performed in two or three minutes, and the stopping is perfect.

The apparatus has already been supplied to a large number of ships, and whenever it has been used the result has given thorough satisfaction. The engineer of the Envoy, after having had occasion to use the apparatus, writes that by its use they "have found it an easy matter to stop up a leaky tube in three minutes without dropping steam, fear of scalding, or other inconvenience;" and Mr. T. O. Charters, superintendent engineer, states that "having now used Mr. Boaz's patent tube stoppers in several vessels under his superintendence, he has great pleasure in bearing testimony to their efficiency as a stopper for leaky tubes, being very simple in applying, and can be fitted in a few minutes without any drawing of fires or any detentive to vessels whatever. He considers no steamer ought to go to sea without them." As the tubes cost but 20s. each, and can be obtained without any further measurements being required than the length of the tube and its inside diameter, there is nothing to prevent their general adoption, and the manufacture of them on a large scale would appear to offer an excellent field for enterprise.

The patent stopper appears to be the most simple and inexpensive stopper that has yet been introduced, and as to its efficiency there is no question; it is easily fixed, as has been explained, and, having served its purpose in enabling the boiler to continue working until it reaches a port where a new tube can be put in, it is then simply necessary to unscrew the nut, G, at the back end of the boiler, which disconnects the back flanges, which can now be forced through so as to fall into the combustion chamber, the small tube and bar being then drawn through from the front end of the boiler. Should the india-rubber want renewing, when none is at hand common gasket packing with red-lead may be used as a substitute, so that the apparatus cannot fail to be at all times available.

GOLD MEDAL.

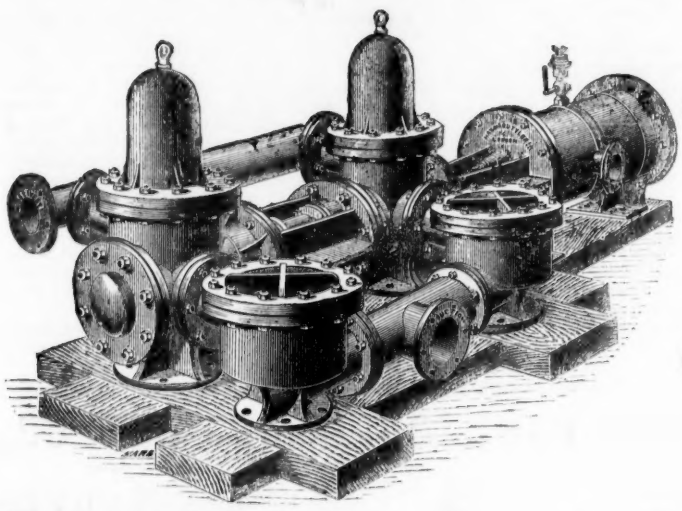
The "COMICE AGRICOLE DE LILLE" have awarded to

HAYWARD TYLER & CO.,

OF LONDON,

THE GOLD MEDAL

FOR THEIR PATENT



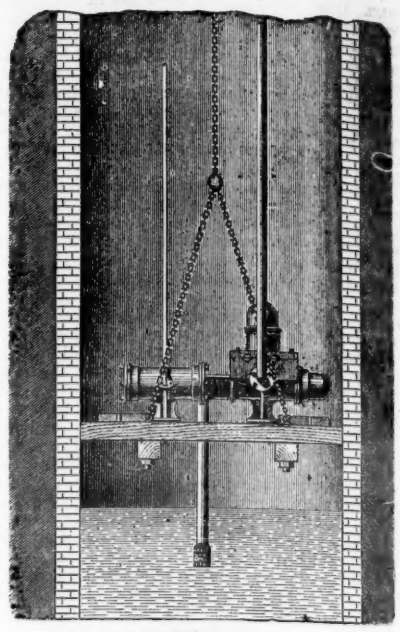
"UNIVERSAL"

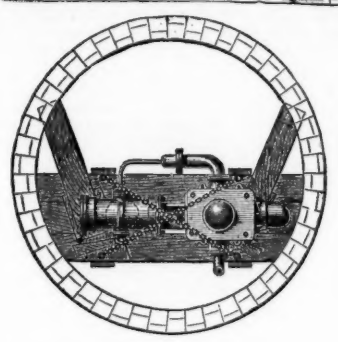
STEAM PUMP,

IN AN

OPEN COMPETITION,

HELD AUGUST, 1874.





Silver Medal: Royal Cornwall Polytechnic Society, 1872.

Medal for Progress: Vienna Exhibition, 1873.

SPECIALLY ADAPTED FOR MINING AND GENERAL PURPOSES.

84 AND 85, UPPER WHITECROSS STREET, LONDON.

COAL-CUTTING MACHINERY.

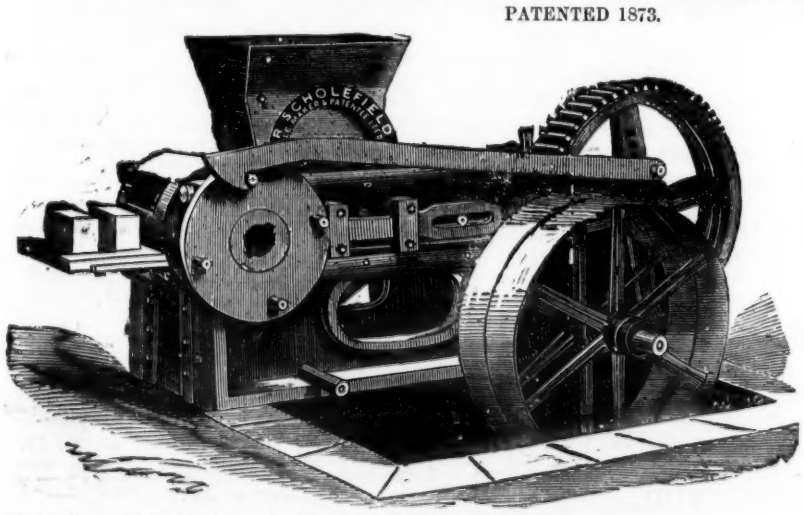
W. and S. FIRTH undertake to CUT, economically, the hardest CANNEL, ANTHRACITE, SHALE, or ORDINARY COAL, ANY DEPTH, UP TO FIVE FEET.

Apply,— **16, YORK PLACE, LEEDS.**

R. SCHOLEFIELD'S

LATEST PATENT BRICK-MAKING MACHINE.

PATENTED 1873.



R. S. begs to call the attention of all Colliery Owners in particular to his PATENT SEMI-DRY BRICK MACHINE, and the economical method of making bricks by his patent machinery from the refuse that is taken from the pits during the process of coal-getting, which, instead of storing at the pit's mouth (and making acres of valuable land useless), is at once made into bricks, at a very small cost, by R. S.'s Patent Brick-making Machinery. If the material is got from the pit hill, the following is about the cost of production, and the hands required to make 10,000 pressed bricks per day:—

2 men digging, each 4s. per day	£0 8 0
1 man grinding, 4s. 6d. per day	0 4 6
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	0 2 0
1 boy greasing, 1s. 6d. per day	0 1 6
1 engine-man, 5s. per day	0 5 0
1 man wheeling bricks from machine to kiln, 4s. per day	0 4 0
Total cost of making 10,000 pressed bricks	£1 5 0, or 2s. 6d. per 1000.

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.
As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

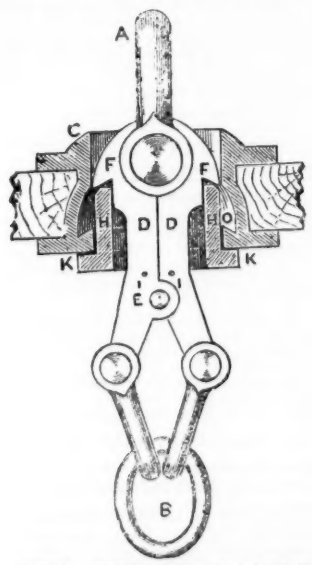
THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY.

SCHOLEFIELD'S ENGINEERING & PATENT BRICK MACHINE WORKS, KIRKSTAL ROAD, LEEDS.

OVERWINDING IMPOSSIBLE.

WALKER'S DETACHING HOOK,

FOR COLLIERIES AND BLAST-FURNACE HOISTS.



SIX LIVES SAVED.

Walker's Hook, at Tockett's sinking, has saved six men's lives On the 6th instant, the kibble was overwound, and but for the hook would have fallen down the pit, where six men were working, 120 ft. below, all of whom would probably have been killed. Thanks, however, to Mr. Walker's invention, the rope alone passed harmlessly over, the kibble remained suspended, and in half-an-hour everything was working as if nothing had occurred.—From the *Northern Echo* August 20, 1874.

Full particulars may be obtained from the Manufacturers,—

THOMAS WALKER AND SON,

58, OXFORD STREET, BIRMINGHAM

COPPEE COKE OVENS

Complete information respecting these

PATENT COKE OVENS

may be obtained from the

COPPEE COKE COMPANY

(LIMITED),

94, GRACECHURCH STREET, LONDON, E.C.

THE IRON AND COAL TRADES' REVIEW:
ROYAL EXCHANGE, MIDDLESBOROUGH.

The IRON AND COAL TRADES' REVIEW is extensively circulated amongst the Iron Producers, Manufacturers, and Consumers, Colowners, &c., in all the iron and coal districts. It is, therefore, one of the leading organs for advertising every description of Iron Manufactures, Machinery, New Inventions, and all matters relating to the Iron, Coal, Hardware, Engineering, and Metal Trades in general.

Offices of the Review: London: 7, Westminster Chambers, S.W.; Middlesborough-on-Tees: Royal Exchange; Newcastle-on-Tyne: 50, Grey-street.

THE "LEVET" ROCK DRILL.

SUPERIOR TO ALL OTHERS.

COPY OF TESTIMONIAL FROM THE ENGINEER, BLANZY MINES, FRANCE. *Feb.* 25, 1875.

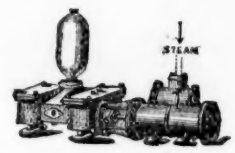
I hereby certify that the new Rock Drill of C. Levet's System has worked at the Blanzy Mines since Nov. 20 without there being the slightest necessity for repair. Its results up to this date have been superior to the other Rock Drills employed in the said mines. (Signed)

THE ENGINEER OF THE MINES, POUMAIREAU.

THE SACCHARUM WORKS, SOUTHAMPTON.
ANGLO-BAVARIAN BREWERY.

GENTLEMEN,—We have much pleasure in stating that the "STANDARD" Steam Pumps supplied to us for these works, and for our Brewery at Shepton Mallet, give us entire satisfaction. The two first we had from you have been in use for 12 months, and they are still in good working order. THEY ARE ENTIRELY FREE FROM THE NOISE IN WORKING WHICH ALL OTHER STEAM PUMPS WE HAVE TRIED ARE SUBJECT TO; they throw a large quantity of liquor fully equal to the amount named in your Circular, and we can confidently recommend them in preference to any other pumps we have used. Yours truly,

(Signed) HILL, GARTON, AND CO.



FOR PARTICULARS OF

ROCK DRILLS, AIR COMPRESSORS, COAL CUTTERS, "STANDARD" PUMPS,

AND ALL OTHER MINING MACHINERY, APPLY TO

CHARLES HARWOOD & CO.,

St. Stephen's Chambers, Telegraph-street, Moorgate-street,

LONDON, E.C.

GEORGE ANGUS AND COMPANY,

ST. JOHN'S LEATHER AND INDIA-RUBBER WORKS,

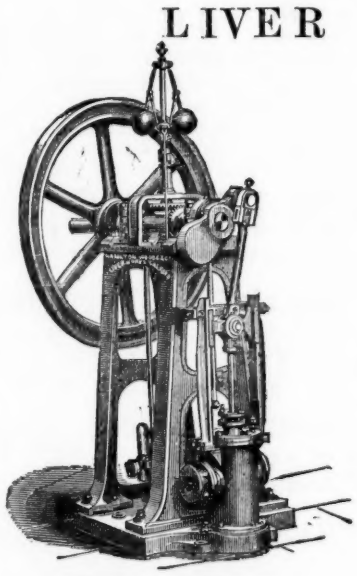
NEWCASTLE-UPON-TYNE.

Every description of Leather, India-rubber, and Gutta-percha for Engineering and General Mechanical purposes.

HAMILTON WOODS AND CO.,

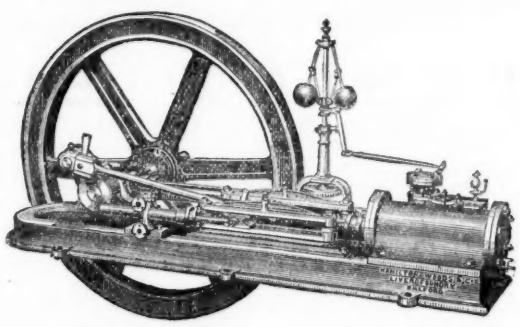
LIVER FOUNDRY, ORDSAL LANE, SALFORD.

VERTICAL AND HORIZTONTAL STEAM ENGINES.



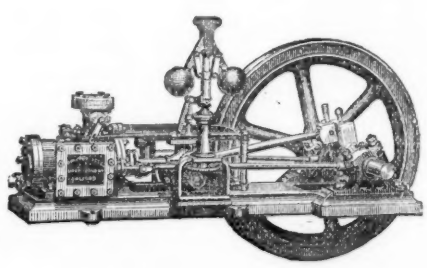
VERTICAL ENGINE.

Horse Power Nom.	Horse Power Ind.	Diam. of Cylin.	Length of Stroke.	Price of Engines	Feed Pump Extra.
		Ins.	Ins.	£.	£. s.
4	10	6½	10	44	4 0
6	16	8	13	60	6 0



HORIZONTAL ENGINE.

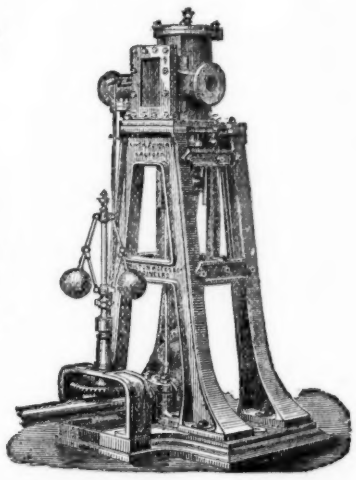
Horse Power Nom.	Horse Power Ind.	Diam. of Cylin.	Length of Stroke.	Price of Engines	Feed Pump Extra.	Variable Expansion Gear
		Ins.	Ins.	£	£ s.	£.
6	15	7½	13	62	5 0	12
8	20	9	18	80	6 0	15
10	26	10½	21	105	7 0	18
12	36	12	24	120	8 0	20
16	48	14	30	150	10 0	24
20	60	16	36	190	10 0	24
30	100	19	39	285	12 0	30



HORIZONTAL ENGINE.

SELF CONTAINED.

Horse Power Nom.	Horse Power Ind.	Diam. of Cylin.	Length of Stroke.	Price of Engines	Feed Pump Extra.
		Ins.	Ins.	£	£. s.
2	5	4½	9	30	3 0
3	7½	5½	10	37	3 10
4	10	6½	10	44	4 0



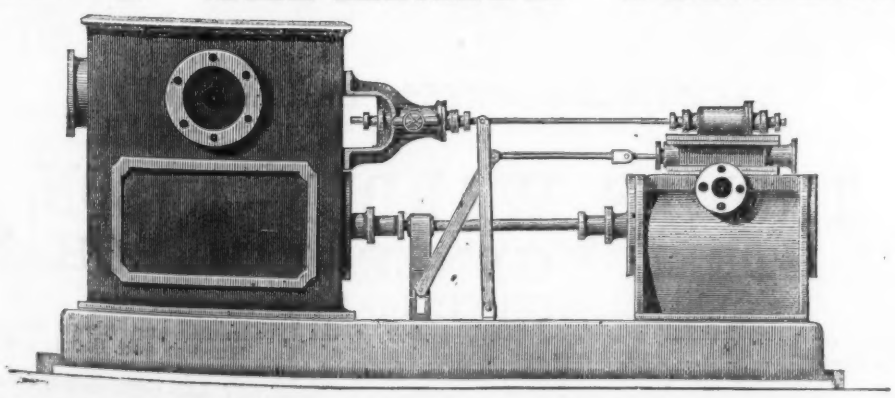
INVERTED ENGINE.

Horse Power Nom.	Horse Power Ind.	Diam. of Cylin.	Length of Stroke.	Price of Engines	Feed Pump Extra
		Ins.	Ins.	£	£. s.
6	16	8	13	70	6 0
12	36	12	24	140	8 0
18	54	15	33	200	12 0

HATHORN, DAVIS, CAMPBELL, AND DAVEY,

SUN FOUNDRY, LEEDS,

PATENT SEPARATE CONDENSER.



Also Compound and Single-cylinder DIFFERENTIAL EXPANSIVE and CONDENSING PUMPING ENGINES—DAVEY'S PATENT. Steam Pumps of various kinds. Hydraulic Pumps for dip workings. Winding Engines. Compound Rotative Engines. High and Low-pressure Steam Boilers, &c.

FURTHER PARTICULARS ON APPLICATION.

TO COLLIERY PROPRIETORS, MINING ENGINEERS, &c.

HADFIELD'S

Steel Colliery Wheels

WITH

PATENT FITTED AXLES AND PEDESTALS.

Also, Hydraulic Cylinders, Pinions, Ship-propellers, Railway Crossings, Skifes for Ploughs, &c.

Also, Cross-heads, Axle-boxes, Horn-blocks Plough-shares, Cultivators, Reaping Machine Fingers, &c.

Hadfield's Steel Foundry Company,

MANUFACTURERS OF EVERY DESCRIPTION OF

CRUCIBLE CAST STEEL CASTINGS

ATTERCLIFFE, SHEFFIELD.

Printed by RICHARD MIDDLETON, and published by HENRY ENGLISH (the proprietors), at their offices, 26, FLEET STREET, E.C. where all communications are requested to be addressed.—July 24, 1875.